1R - 490

GENERAL CORRESPONDENCE

YEAR(S): 2005-2003

R. T. HICKS CONSULTANTS, LTD.

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January 25, 2005

Mr. Wayne Price
New Mexico Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

RE: M-5 Redwood Tanks, Section 5 T20S R37E Unit M
NMOCD Case #NOT YET ASSIGNED

Dear Wayne:

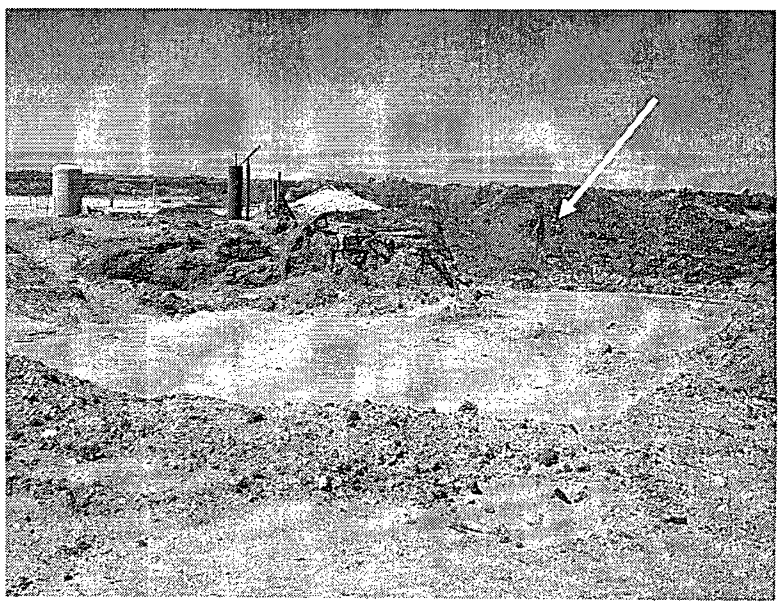
In your E-mail of November 18, 2004, you wrote:

1. Collect soil samples 3 feet below the bottom of where the two tanks sit. Soil samples shall be analyzed for BTEX, TPH and Chlorides.

2. Provide documentation from the landowner that burying the asphaltic material is permissible. If landowner agrees, then perform a SPLP 1312 on this material.

3. Notify this office and the local OCD office when sampling occurs.

With respect to items 1 and 3, ROC routinely collects samples such as you requested prior to closure of sites. In the future, we will specifically reference this standard closure protocol our corrective action plan. We will notify the local NMOCD office 72 hours before ROC obtains the samples. Please examine Figure 1, which is a southwestern looking view of the depression caused by removal of the redwood tanks. We have attached the original file of this digital image to this submission to permit close examination. The green hardware (well control valve) and 165-gallon white tank are associated with the active salt water disposal well that will remain on-site. In the bottom of the depression are the two circular concrete bases of the former tanks. Cleaning and inspection of these concrete bases shows no discoloration of the concrete due to intrusion of produced water and hydrocarbons and no fractures or other conduits that would allow seepage to the subsurface through the concrete. The attached image labeled



"hole 1" provides a close-up of the concrete pad. We do not propose to compromise the integrity of these concrete pads to obtain samples directly below the tanks. These images suggest that seepage from the tanks occurred through the redwood or where the redwood met the concrete. We will sample in the areas of obvious seepage at or near the edges of the concrete slab.

Figure 1 does show discolored soil to the left (east) of the active disposal well and a stockpile of discolored soil on the west side of the well. Our Corrective Action Plan presents data from two boreholes located in the area of the stockpile shown in Figure 1. Samples from these borings (SB-3 and SB-4) detected high total petroleum hydrocarbon values but low BTEX concentrations. Below we reproduce a portion of the soil analytical results from our Corrective Action Plan.

Well_ID	Date	GRO_C6_C12	DRO_>C12_C35	TOTAL_C6_C35	Chloride	Benzene	Toluene	Ethylbenzene	p/mXylene	oXylene
		Results in mg/kg				Results in ug/kg				
M5 SB4 4'	11/5/2003	1740	11300	13040		74.1	<25	476	1560	65.9
M5 SB4 2'	11/5/2003	203	2210	2413	88.6	<25	<25	1090	228	25.3
M5 SB4 6'	11/5/2003	133	593	726		<25	<25	325	<25	<25
M5 SB4 7'	11/5/2003	56.6	161	218	35.4	<25	<25	143	38	<25

We placed our hand-auger boring (B-4) about 3 feet from the edge of the tank; the arrow in Figure 1 is the location of this boring. Boring B-4 was located essentially at the edge of the depression shown in Figure 1. To provide additional characterization of the residual hydrocarbon material, as requested by NMOCD, we plan the following:

1. Obtain 2 representative samples from the side of the depression where the tanks once stood at the location of SB-4 to confirm the initial results presented in our Corrective Action Plan.
2. Hand auger below the concrete pad at this same location to a depth of 9 and 11 feet below the original grade (about 2 and 4 feet below the concrete pad) and obtain samples for TPH and BTEX.
3. Obtain 2 samples using the protocol outlined in 1 (for a sample above the pad) and 2 (for a sample below the pad) above at the location east of the active disposal well where Figure 1 shows some discoloration of soil.
4. Repeat the protocol at a third location selected to characterize the residual soil near the eastern-most tank pad.
5. Obtain one sample of the surface asphaltic material that comprised the berms around the former storage tanks.
6. We will ask the laboratory to analyze these nine (9) samples for TPH and BTEX using the following methods:
   - (i) bvBenzene, toluene, ethylbenzene and xylene
     - EPA Method 8021
   - (ii) Total Petroleum Hydrocarbons
     - EPA Method Modified 8015
   - (iii) Chloride
     - EPA Method 300

7. As a matter of academic interest and to respond to NMOCD's second request, we will ask the laboratory to use the SPLP method (BTEX) for the two samples that exhibit the highest TPH concentration.

Some states employ the SPLP analytical method to evaluate Risk Based Corrective Action initiatives at specific sites. As directed by the NMOCD, we will comply with your request and employ this method as outlined in item 7 of our proposed scope of work. To what shall we compare these results? In New Mexico, a protocol for evaluating a risk-based corrective action for residual hydrocarbons in soil does exist within the UST Guidance manual; however the UST Manual does not employ the SPLP method.

If the analyses confirm the results presented in the Corrective Action Plan, we will anticipate NMOCD approval of the plan and we will move forward as proposed.

With respect to NMOCD request #2, we need clarification regarding the regulatory authority for this request in order to gain approval for this action by the System Partners. We clearly understand NMOCD's mandate under the Oil and Gas Act is protection of fresh water, public health and the environment. If NMOCD agrees that our plan provides such protection and approves this Corrective Action Plan, we will notify the landowner as is our custom. If any landowner objects to any Corrective Action Plan that is consistent with Regulations or Rules, we will discuss the plan with the landowner and negotiate a business solution that remains consistent with Rules and is consistent with our lease. Perhaps these negotiations will cause us to submit a modification to the approved plan. However, in the absence of an NMOCD-approved Corrective Action Plan, we have nothing to present to the landowner.

ROC would like to resolve this matter to permit backfilling of the depression shown in Figure 1.

Sincerely,
R.T. Hicks Consultants, Ltd.

Randall Hicks

Randall Hicks
Principal

R. T. HICKS CONSULTANTS, LTD.

219 Central Avenue NW Suite 266 Albuquerque, NM 87102 505.266.5004 Fax: 505.246.1818

July 7, 2003

Mr. Wayne Price
New Mexico Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

RE: M-5 Redwood Tanks, Section 5 T20S R37E Unit M

Dear Mr. Price

Rice Operating Company retained Hicks Consultants to address potential environmental concerns at the above referenced site. This submission proposes a scope of work that we believe will best mitigate any threat to human health and the environment and lead to closure of the regulatory file for this site.

Background

The M-5 Redwood Tank Site is located about 2 miles southwest of Monument, New Mexico. Figure 1 shows the location of the site. Rice Operating Company (ROC) is the service provider (operator) for the Eunice-Monument-Eumount (EME) Saltwater Disposal System and has no ownership of any portion of pipeline, well, or facility. The EME System is owned by a consortium of oil producers, System Partners, who provide all operating capital on a percentage ownership/usage basis. Major projects require System Partner authorization of expenditures (AFE) approval and work begins as funds are received. We will implement the work outlined herein after NMOCD approval and subsequent authorization from the System Partners.

1. Evaluate Possible Impacts to Soil and Ground Water

The M-5 Redwood Tanks have operated for several decades and will be replaced with tanks that meet more current industry standards. ROC has replaced several such tanks in the past and found that some of these sites caused impairment of ground water quality or have the potential to cause such impairment. The first task of this work assignment is determining the magnitude and extent of any such impairment.

The HYDRUS1D and mixing model simulation, which we plan to employ in Task 2, requires input of 10 parameters. As Table 1 shows, we must collect site specific data for several of these parameters. First we will measure the depth to ground water at nearby windmills and monitoring wells to determine the hydraulic gradient. Figure 1 shows the location of four windmills which we hope to employ in this initial water level measurement program. We know that several monitoring wells are nearby, such as the ROC well at the P-6 site, west of the tanks. We will employ this well and others to clearly establish the hydraulic gradient of the area and the direction of ground water flow.

Table 1: Input Parameters for Simulation Modeling

Input Parameter	Source
Vadose Zone Thickness	Proposed monitoring well and borings
Vadose Zone Texture	Proposed monitoring well and borings
Dispersion Length	Professional judgment
Soil Moisture	Field Measurements from borings
Vadose Zone Chloride Load	Proposed borings adjacent to the tanks
Length of release perpendicular to ground water flow	Field Measurements
Climate	Pearl, NM station (Hobbs)
Background Chloride in Ground Water	Samples from nearby water supply wells and monitoring wells
Ground Water Flux	Calculated from regional hydraulic data and data from nearby wells
Aquifer Thickness	Nicholson and Clebsch (1960) and SEO data and proposed monitoring well

Because ROC plans to move forward with taking these two tanks out of service and constructing new facilities adjacent to the existing tanks, our work is independent of this replacement program. We plan to collect samples from four boreholes adjacent to the tanks to obtain information for other input parameters.

On the northwest side of the tanks (up gradient of probable ground water flow), we will install a boring as close as practical to the existing tanks, perhaps between the two tanks. Drilling and sampling will cease in this borehole when we encounter ground water (approximately 30 feet below grade). We propose a second boring 15 feet west of the westernmost tank and a third boring 30 feet east of the easternmost tank. Again, drilling and sampling will cease in these boreholes when we encounter ground water. Sixty feet southeast of the tanks, we plan a fourth boring which we will convert to a monitoring well as described later.

From each boring, we will obtain split-spoon soil samples every five feet of the vadose zone. We will evaluate these discrete samples, the borehole drilling characteristics, and drill cuttings to develop a lithologic profile of the vadose zone. We will employ standard methods, as described in the Junction Box Replacement Program Plan, to evaluate all soil samples in the field for chloride content and TPH content (for the chloride and TPH load). We will submit at least one soil sample from each boring to a qualified laboratory for evaluation of chloride and BTEXN (benzene, toluene, ethylbenzene, xylene, naphthalene).

The field geologist will identify samples for laboratory analysis after review of the field analysis of chloride and TPH. The geologist will select two samples from the first boring and two samples from the fourth boring for laboratory analysis of soil moisture content and bulk density.

After we complete the sampling program described above for the fourth boring, will continue drilling through the saturated zone to the top of the Dockam Group red beds, which form the base of the aquifer in this area. If the saturated thickness of the aquifer in this boring is less than 25 feet, we will install a 2-inch monitoring well with five feet of screen above the water table and 15 feet below the water table, in a manner consistent with industry standards (see NMOCD, ASTM or EPA publications). If the saturated thickness of the aquifer is greater than 25 feet we will install two 2-inch wells in the same boring. We will complete the uppermost well as described above. In the deeper well, we will install 5 feet of well screen above the top of the Dockam Group red beds. If possible, we will isolate the two screened intervals by installing bentonite pellets above the lowermost screened interval.

To establish background chloride concentrations in ground water, we propose to sample Water Wells #1 and #2 on Figure 1. We also plan to employ water analysis from a proposed background monitoring well (MW-3) at the ROC P-6 Line Leak Site (work plan submitted by Trident Environmental).

2. Evaluate Chloride, Benzene and Naphthalene Flux from the Vadose Zone to Ground Water

We propose to employ HYDRUS1D and a simple ground water mixing model to evaluate the potential of any residual chloride and hydrocarbon mass in the vadose zone to materially impair ground water quality at the site. We will employ predictions of the migration of chloride ion, benzene and naphthalene from the vadose zone to ground water in our selection of an appropriate remedy for the land surface and underlying vadose zone. This simulation is the "no action" alternative, which predicts chloride flux to ground water in the absence of any action by ROC. We have selected these three constituents for simulation modeling because each of these constituents exists in the fluids stored in the tanks and each is specifically regulated by New Mexico ground water regulations (WQCC).

We might provide simulations of two "no action" scenarios. For both simulations, we will employ the input parameters to HYDRUS and the mixing model outlined in Table 1. In the first simulation, we will assume that vegetation is not present over the release site (no evapotranspiration) and a minimum aquifer thickness of 10 feet. This will simulate restriction of any released chloride and hydrocarbons to a portion of the underlying aquifer. If this first simulation does not return results that are consistent with the ground water data from the proposed monitoring well (see below), we will increase the aquifer thickness in the mixing model to the total thickness measured in nearby water supply wells or from the proposed monitoring well. At other sites, we have found that chloride can be distributed throughout the thickness of the aquifer. Employing the entire thickness of the aquifer in the mixing model calculations for chloride may be appropriate for M-5 tank site. Data may show that employing the entire aquifer thickness in the mixing model for hydrocarbons may not be appropriate.

3. Design Remedy and Submit Report

After ROC completes the replacement of the tanks, we anticipate no additional releases of produced water. Our modeling of the "no action alternative" (Task 1) may show that the residual chloride and hydrocarbon mass in the vadose zone poses a threat to ground water quality. If such a threat does exist, we will use the HYDRUS-1D model predictions to develop a remedy for the vadose zone. If necessary, we will simulate:

1. excavation, disposal and replacement of clean soil to remove the chloride and hydrocarbon mass,
2. installation of a low permeability barrier to minimize natural infiltration,
3. surface grading and seeding to eliminate any ponding of precipitation and promote evapotranspiration, thereby minimizing natural infiltration, and
4. a combination of the above potential remedies.

We will select the vadose zone remedy that offers the greatest environmental benefit while causing the least environmental damage.

We will use the ground water mixing model or a suitable alternative to assist in the design of a ground water remedy. It is possible, however, that the background chloride and /or hydrocarbon concentrations in ground water measured in the nearby windmills are equal to or higher than the concentration in the proposed monitoring well. Such data would strongly suggest that the M-5 tank site has not caused any material impairment of ground water quality. If we find no evidence of impairment of water quality due to past activities, we will not prepare a ground water remedy. If data suggest that the site has contributed chloride or hydrocarbons to ground water and caused ground water impairment, we will examine the following alternatives:

1. Natural restoration due to dilution and dispersion,
2. Pump and dispose to remove the chloride and hydrocarbon mass in the saturated zone,
3. Pump and treat to remove the chloride and hydrocarbon mass in the saturated zone,
4. Because of the location of the site, institutional controls negotiated with the landowner may provide an effective remedy. Such controls may be restriction of water use to livestock until natural restoration returns the water quality to state

standards, a provision for alternative supply well design, or a provision for well head treatment to mitigate any damage to the water resource.

We plan to commence data collection for the HYDRUS1D simulations described above in late August or September. Your approval to move forward with this work plan will facilitate our access to nearby windmills an, approval of expenditures by the System Partners.

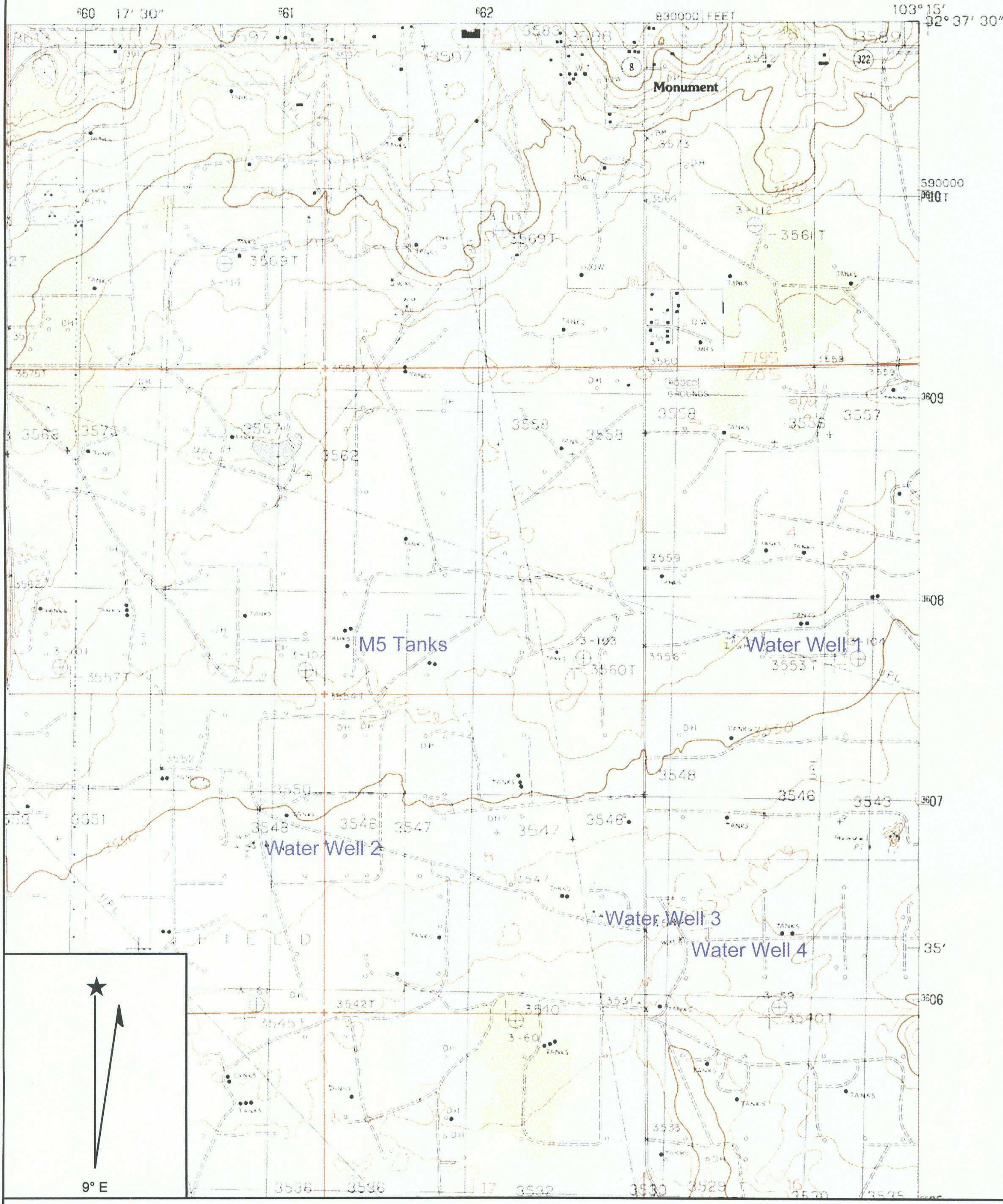
Sincerely,
R.T. Hicks Consultants, Ltd.

Randall T. Hicks
Principal

Copy:
Rice Operating Company

Figure 1: Location Map

7.5 MINUTE SERIES (TOPOGRAPHIC)



Name: MONUMENT SOUTH
Date: 7/7/2003
Scale: 1 inch equals 2000 feet

Location: 13 662205 E 3608045 N