Bryan W. Shaw, Ph.D., *Chairman*
Buddy Garcia, *Commissioner*
Carlos Rubinstein, *Commissioner*
Mark R. Vickery, P.G., *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

December 20, 2011

Mr. Stephen Halaz
TRC Environmental Corporation
505 East Huntland Drive, Ste. 250
Austin, Texas 78752

Re: Approval to Conduct On-Site Wastewater Treatment and Irrigation
Falcon Refinery
1472 FM 2725, San Patricio County, Ingleside, Texas 78362
SUP111

Dear Mr. Halaz:

The Texas Commission on Environmental Quality (TCEQ) has reviewed the response to the proposed Texas Land Application Permit and amended materials and approves of the request to conduct the wastewater treatment and irrigation. Please see the attached TCEQ Interoffice Memorandum, dated December 14, 2011, containing the Water Quality Assessment Team's conditions for conducting the irrigation of the treated wastewater on the Falcon property.

If you have any questions, or wish to discuss any of these matters, please call me at (512)239-1054, or email me at Phillip.Winsor@tceq.texas.gov.

Sincerely,

Phillip Winsor

Phillip Winsor, P.E.
Superfund Section
Remediation Division

PW/sr

cc: Rafael Casanova, RPM, U.S. Environmental Protection Agency, Superfund Division (6SF-RA), 1445 Ross Avenue, Suite 1200, Dallas, TX 75202-2733
Gary Moore, OSC, U.S. Environmental Protection Agency, Superfund Division (6SF-PR), 1445 Ross Avenue, Suite 1200, Dallas, TX 75202-2733
Satya Dwivedula, P.E., TCEQ, Wastewater Permits Section, Bldg F, MC-148

Attachment

Texas Commission on Environmental Quality

INTEROFFICE MEMORANDUM

TO: Phillip Winsor, P.E., Project Manager
Superfund Section, Remediation Division (MC 136)

DATE: December 14, 2011

Thru: Yvonna Miramontes, Team Leader
Industrial Permits Team, Water Quality Division (MC 148)

From: Satya Dwivedula, P.E., Permit Writer
Industrial Permits Team, Water Quality Division (MC 148)

Subject: National Oil Recovery Corporation (NORCO), Falcon Refinery Superfund Site (the facility)

The following is a summary of our understanding and recommendations based on the information provided via Interoffice Memorandum (IOM) dated August 16, 2011 and additional information submitted via IOM dated November 21, 2011.

Background

NORCO proposes to land apply approximately 2,000,000 gallons of wastewater stored in an open-top above ground storage tank (AST) that was formerly operated as part of the Falcon Refinery. The facility consists of an oil refinery that operated intermittently that is currently inactive.

Almost all of the wastewater proposed for the land application is storm water accumulated inside several ASTs that were empty of fluids. The ASTs contained residual material and sludge leftover from former operations at the facility. Historically, these ASTs were used to store petroleum hydrocarbon products. The wastewater contains minor concentrations of petroleum hydrocarbons due to its contact with residues that were present in the ASTs.

NORCO proposes to treat the wastewater through carbon filtration, pH stabilization, and a system to reduce the salinity (nanofiltartion or nanofiltration combined with reverse osmosis) if necessary, prior to disposal via spray irrigation of native grasses and small shrubs.

NORCO proposes to land apply the wastewater over a 128-day period at an application rate of 15,649 gallons per day [0.016 million gallons per day (MGD)]. No additional fertilizer or watering requirements were proposed for the irrigation of native grasses and small shrubs.

This Interoffice Memorandum shall not be construed as a permit to authorize the land application of wastewaters. Industrial Permits Team recommends the following conditions for the proposed land application. The intent of these conditions is to restrict discharge of wastes into waters in the state. The definition of waters in the state, as provided in Texas Water Code § 126.001, includes groundwater. Based on its knowledge of the site-specific conditions, the Superfund Section may impose additional conditions to prevent pollution or nuisance conditions.

Conditions for Land Application

1. The land application shall be confined to the irrigation areas marked in Attachment A. Three piezometers shall be installed at the locations indicated in Attachment A and shall be used to monitor the presence of a seasonal high water table prior to each wastewater application. Irrigation shall not occur when a seasonal water table is within 4 feet of the soil surface. The piezometers shall remain covered except during water table measurements. No wastewater may be applied within twenty-four hours after a measured rainfall of 0.5 inches or greater, or to any zone containing standing water. A rain gauge shall be maintained on-site. Continuous rainfall records are not required, but it is the burden of NORCO to demonstrate that the land application was not conducted during rain events of 0.5 inches or greater.

2. Irrigation shall occur only during the months of March through August.

3. Prior to the land application, NORCO shall provide wastewater pollutant analysis for all parameters provided in Tables 1 and 2 of Attachment B, for at least one sample. NORCO shall submit copies of the completed Attachment B along with copies of the laboratory report to the Superfund Section.

4. NORCO shall use cultural practices to promote and maintain the health and propagation of the native grass crop. NORCO shall harvest the crop (cut and remove it from the field) at least one time during the year. Harvesting and mowing dates shall be recorded in a log book kept on site to be made available to TCEQ personnel upon request.

5. NORCO shall monitor the physical condition of the land application fields on a weekly basis. Any areas with problems such as surface runoff, surficial erosion, stressed or damaged vegetation, etc., shall be recorded in the field log kept onsite and corrective measures shall be implemented immediately.

6. Soil Testing Plan

   NORCO shall obtain representative soil samples from the root zones of the land application area. Composite sampling techniques shall be used. Each composite sample shall represent no more than 5.52 acres with no less than 10 to 15 subsamples representing each composite sample. Subsamples shall be composited by like sampling depth, type of crop and soil type for analysis and reporting. Soil types are soils that have like topsoil or plow layer textures. These soils shall be sampled individually from 0 to 6 inches, 6 to 18 inches, and 18 to 30 inches below ground level. When irrigating, NORCO shall sample and analyze soils between December and February annually. Soil samples shall be analyzed within 30 days of collection. NORCO shall provide annual soil analyses of the land application area according to the following table:

Parameter	Method	Minimum Analytical Level (MAL)	Reporting units
pH	2:1 (v/v) water to soil mixture	0.1	Standard units
Electrical Conductivity	Obtained from the Sodium Adsorption Ratio (SAR) water saturated paste extract	0.01	dS/m (same as mmho/cm)
Nitrate-nitrogen, ammonium-nitrogen	From a 1 N KCl soil extract	1	mg/kg (dry weight basis)
Total Kjeldahl Nitrogen (TKN)	For determination of Organic plus Ammonium Nitrogen. Procedures that use Mercury (Hg) are not acceptable.	20	mg/kg (dry weight basis)
Total Nitrogen	= TKN plus Nitrate-nitrogen		mg/kg (dry weight basis)
Plant-available: Phosphorus	Mehlich III with inductively coupled plasma	1	mg/kg (dry weight basis)
Plant-available: Potassium (K) Calcium (Ca) Magnesium (Mg) Sodium (Na) Sulfur (S)	May be determined in the same Mehlich III extract with inductively coupled plasma	5 (K) 10 (Ca) 5 (Mg) 10 (Na) 1 (S)	mg/kg (dry weight basis)
Water-soluble: Sodium (Na) Calcium (Ca) Magnesium (Mg)	Obtained from the SAR water saturated paste extract	1 (Na) 1 (Ca) 1 (Mg)	Water soluble constituents are reported in mg/L
(SAR)	$SAR = \frac{Na}{\sqrt{\frac{(Ca + Mg)}{2}}}$		Express concentrations of Na, Ca and Mg in the water saturated paste extract in milliequivalents/liter (meq/L) to calculate the SAR. The SAR value is unit less. If the SAR is greater than 10, amendments (e.g., gypsum) shall be added to the soil to adjust the SAR to less than 10.
Amendment addition, e.g., gypsum	Recommendation from analytical laboratory		Report in tons/acre in the year effected

A copy of this soil testing plan shall be provided to the analytical laboratory prior to sample analysis. NORCO shall submit the results of the annual soil sample analyses with copies of the laboratory reports and a map depicting the permanent sampling fields to the Superfund Section, no later than the end of September of each sampling year. If wastewater is not applied in a particular year, NORCO shall notify the Superfund Section and indicate that wastewater has not been applied on the approved land irrigation site(s) during that year and soil analyses will not be required.

7. The irrigation system shall be constructed in accordance with the conceptual design provided in Attachment C.

8. The quality and the loadings of the treated wastewater shall be maintained as follows:

   a. hydraulic loading: ≤ 3.18 inches per acre per month (in/ac/month)

   b. daily maximum effluent flow: ≤ 15,649 gallons per day (0.015649 MGD)

   c. daily maximum total nitrogen loading: ≤ 0.436 lbs/acre/day

   d. conductivity: < 4.0 milli-Siemens per centimeter (mS/cm)

   ~~e. pH: between 6.0 and 9.0 standard units.~~

   Conductivity and pH shall be measured once per week by grab sample, when irrigating. The flow shall be recording using a flow Totalizer, downstream of Tank 26 (2,000,000-gallon tank) prior to land application via spray irrigation. Records of these measurements shall be maintained in a log book on site and shall be made available to the TCEQ personnel upon request.

9. NORCO shall provide a readily accessible sampling point and flow measuring device.

10. NORCO shall provide adequate maintenance of the treatment and irrigation facilities to ensure that the facilities are in working condition.

11. The wastewater treatment system shall be operated according to the procedures described in *Section 2.0* of the report titled *Texas Land Application Permit* dated July 2011. A copy of this report shall be maintained at the facility along with a copy of the additional information provided to the Superfund Section by TRC Environmental Corporation via its letter dated November 17, 2011.

12. The wastewater effluent application areas must be located at a minimum horizontal distance of 150 feet from a private water well; and must be located at a minimum horizontal distance of 500 feet from a public water well, spring, or other similar sources of public drinking water per 30 TAC §309.13 (c).

13. A minimum horizontal buffer distance of 50 feet from the wastewater effluent application area and onsite surface water features and pond shall be maintained.

14. Irrigation practices shall be designed and managed to prevent contamination of ground or surface waters and to prevent the occurrence of nuisance conditions. Tail water control facilities shall be provided, where necessary, to prevent the discharge of any wastewater which might drain from irrigated lands to water in the state.

15. Adequate signs shall be erected stating that the irrigation water is from a non-potable water supply. Said signs shall consist of a red slash superimposed over the international symbol for drinking water accompanied by the message "Do not drink the water", in both English and Spanish.

16. NORCO shall maintain an operating log which records the volume of wastewater used for irrigation each day, the hours the wastewater is applied each day, and the actual surface area wetted each day. These logs shall be retained on site and available for inspection by authorized representatives of the TCEQ.

17. NORCO shall maintain a minimum two-foot freeboard for Tank 26 and any other non-enclosed storage areas that could receive precipitation.

18. In addition to the 2,000,000-gallon storage available in Tank 26, NORCO shall implement measures or provide an additional storage capacity of 333,177 gallons. This shall be demonstrated by the following:

    a. construction of irrigation holding pond(s);

    b. provision of alternate source of storage with sufficient capacity;

    c. development of a contingency plan to demonstrate that NORCO is capable of managing additional 333,177 gallons of storage volume. This plan shall be put into effect prior to an unauthorized discharge and may include, but is not limited to, the following:

        i. contracting a third party to haul the additional wastewater volumes offsite;
        ii. connecting to a Publicly Owned Treatment Works (POTW);
        iii. modifying storm water management or implementing evaporation enhancing measures.

    d. any combination of 18 a., 18 b., and 18. c.

    NORCO shall submit a proposal, which demonstrates the capability to sufficiently satisfy the above requirements to the Superfund Section.

If you have any questions regarding the conditions, you may contact me at extension 3548 or via agency e-mail at satya.dwivedula.

Satya

Satya Dwivedula, P.E.

December 14, 2011
Date

ATTACHMENT A

LEGEND

- IRRIGATION FIELD
- PIPING
- WATER FILTRATION VESSELS
- STORMWATER RUNON CONTROLS
- 100-FOOT BUFFER ZONE
- PIEZOMETER INSTALLED 6 FT BELOW GROUND SURFACE

SOURCE: NATIONAL AGRICULTURE IMAGERY PROGRAM (NAIP) 2009.

N

0 95 190 380 Feet

SITE MAP

FALCON REFINERY
INGELSIDE, TEXAS

PROJECT NO.: 182978	DATE: 11/15/2011

TRC
505 EAST HUNTLAND DRIVE
SUITE 250
AUSTIN, TEXAS 78752
512-329-6080

FIGURE 2

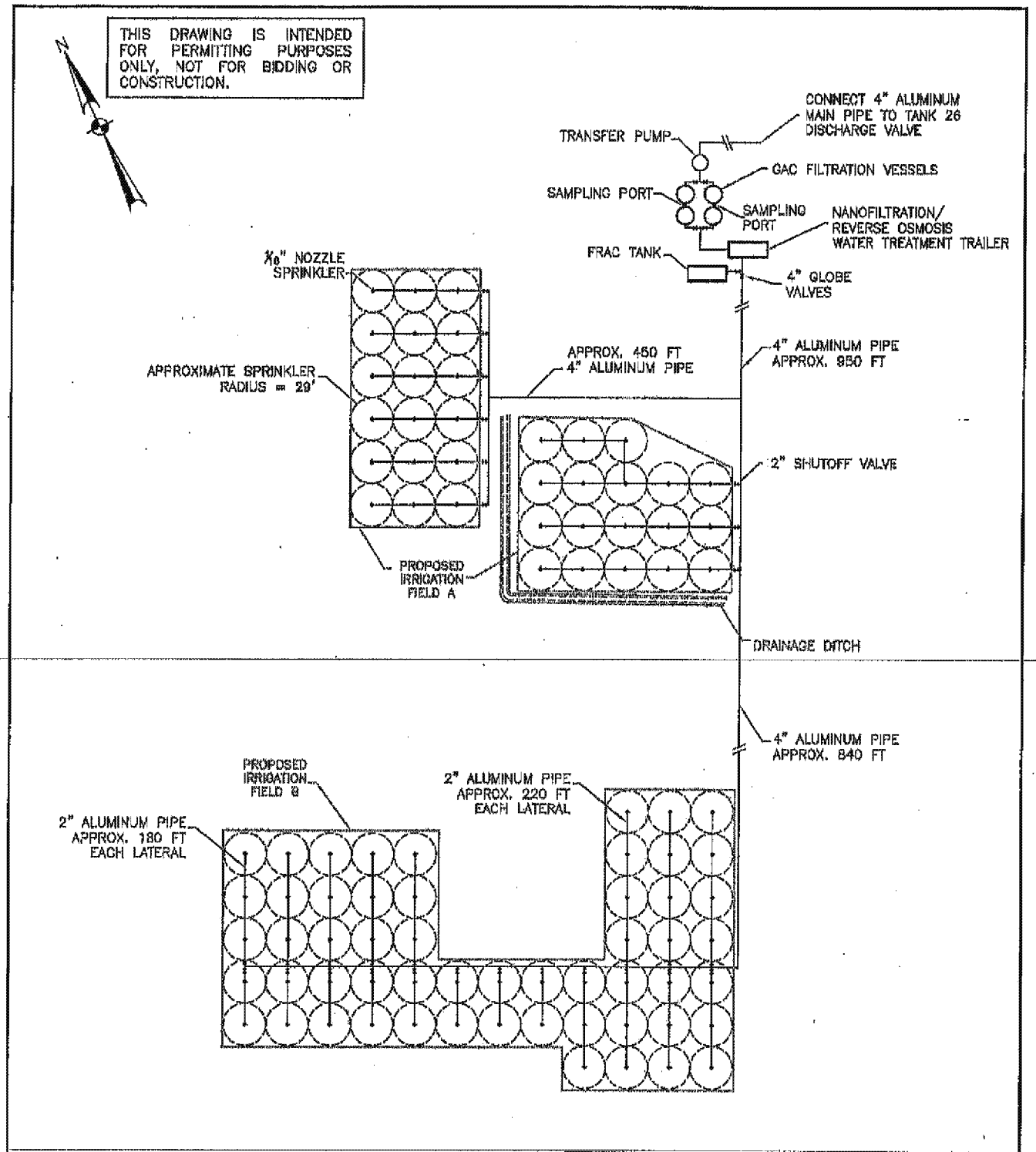
Attachment B: Table 1

Site No.:	☐C ☐G	Effluent Concentration (mg/l)			
Pollutants	Samp. 1	Samp. 2	Samp. 3	Samp. 4	Average
BOD (5-day)					
CBOD (5-day)					
Chemical Oxygen Demand					
Total Organic Carbon					
Ammonia Nitrogen					
Total Suspended Solids					
Nitrate Nitrogen					
Total Organic Nitrogen					
Total Phosphorus					
Oil and Grease					
Total Residual Chlorine					
Total Dissolved Solids					
Sulfate					
Chloride					
Fluoride					
Fecal Coliform					
Specific Conductance (mmhos/cm)					
pH (Standard Units; min/max)					
Soluble Sodium					
Soluble Calcium					
Soluble Magnesium					
SAR					

Attachment B: Table 2

Pollutants	Samp. 1	Samp. 2	Samp. 3	Samp. 4	Average	MAL (µg/l)
	Effluent Concentration (µg/l)					
Total Aluminum						30
Total Antimony						60
Total Arsenic						10
Total Barium						10
Total Beryllium						5
Total Boron						20
Total Cadmium						1
Total Chromium						10
Trivalent Chromium						N/A
Hexavalent Chromium						10
Total Copper						10
Cyanide						20
Total Lead						5
Total Mercury						0.2
Total Nickel						10
Total Selenium						10
Total Silver						2.0
Total Thallium						10
Total Zinc						5

ATTACHMENT C



LEGEND

- PROPOSED IRRIGATION AREAS
- 2" / 4" SHUTOFF VALVE
- SPRINKLER HEAD

NOTES

GAC = Granulated Activated Carbon.
The final dimensions and layout may vary from this conceptual design to accomodate field conditions. This drawing is not to scale.

WATER TREATMENT AND IRRIGATION SYSTEM

TEXAS LAND APPLICATION PERMIT (TLAP)
FALCON REFINERY
INGLESIDE, SAN PATRICIO COUNTY, TEXAS 78362

PROJECT NO.	182978	DWG FILE	182978-6-4.DWG
DRAWN BY.	CM	DATE	11/15/2011

TRC
505 EAST HUNTLAND DRIVE
SUITE 250
AUSTIN, TEXAS 78752
(512) 329-5080

FIGURE 4