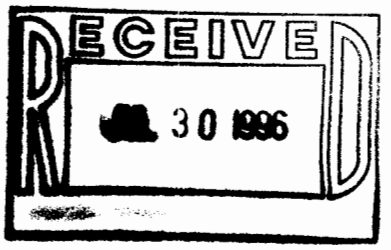
Barbara

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 377TH AIR BASE WING (AFMC)

26 Jul 96

377 ABW/EMR
2000 Wyoming Blvd SE
Kirtland AFB NM 87117-5659



Mr. Benito Garcia, Chief
Hazardous and Radioactive Materials Bureau
NM Environment Department
P.O. Box 26110
Santa Fe NM 87502

Dear Mr. Garcia

As part of our on-going partnering meetings, Kirtland AFB agreed to provide NMED with a summary of risks identified to date at SWMU ST-70, Kirtland AFB Oil/Water Separators (IRP Site ST-70). This summary represents our current understanding at two of the oil/water separators (OWSs) that are part of ST-70 of the nature and extent of contamination at the site in qualitative terms. It also stresses the potential effect that contaminants may have on nearby human and environmental receptors, and identifies the risks and compares them to factors included within the RCRA/HSWA permit as being important when considering use of early corrective action directives or orders to achieve risk reduction.

This letter is not intended to satisfy any RCRA Facility Assessment, RCRA Facility Investigation, or other quarterly reporting requirement stipulated within Kirtland AFB's RCRA/HSWA permit. Our goal is to lend focus to our ongoing restoration efforts by communicating to the public potential risks at selected high relative risk sites. This should encourage public participation in the planning and implementation of necessary activities to reduce risk as early and expeditiously as possible.

Site Description

Oil/Water Separator, Holding Tank, and Fuel Filter Rack, Building 377
(Formerly KAFB Site No. ST-210, Part of SWMU No. 10-7)

The OWS, holding tank, and fuel filter drying rack are in the western portion of Kirtland AFB along the northwest exterior side of Building 377, the fuel tanker maintenance shop. The holding tank is approximately 5 ft deep, and the OWS is 7 ft

deep. Both units are cylindrical, made of concrete, measure 3.7 ft in diameter, and are covered with solid aluminum lids. The OWS receives inflow from area drains inside Building 377 and from floor drains in Building 378. Water-phase liquid discharges from the unit northeast to a storm sewer lateral. The OWS discharges oil-phase liquid southwest through a buried pipe to the holding tank. Both the OWS and holding tank were taken out of service in August 1994. In February, 1996, the OWS was removed and replaced by a new unit approximately 25 ft northwest. The holding tank was abandoned in place. The water-phase discharge line has been rerouted to the sanitary sewer system.

Building 377 area is underlain by unconsolidated alluvial sediment that is predominantly silty sand to very fine-grained sands and fine-grained to medium-grained sand at depths greater than 30 ft. A very dense layer, possibly cobbles or boulders, was encountered at a depth of about 57 ft in borehole ST-210-08. Caliche was present in most boreholes as light- to heavily stained zones and patches. The upper portion of the Santa Fe Group sediments presumably underlie this area. As a result of installation, it is probable that backfill material is present adjacent to the OWS and holding tank to a depth equal to their depth.

Groundwater beneath ST-70 at this site is found within the Upper Santa Fe sediments and is generally thought to be unconfined in the upper portion of the aquifer. This area is within the HR1 saturated zone setting as defined by SNL studies. Hydrogeologic characterization in this portion of Kirtland AFB is complicated by the presence of numerous production wells. It is unlikely that uniform groundwater conditions exist in this region. Local cones of depression associated with groundwater withdrawal have altered the groundwater flow direction in the vicinity of the well fields. The gradient is probably northeast in this area. Three production wells are located near these sites: KAFB-14 is 1,700 ft east upgradient, KAFB-12 is 2,800 ft north-northwest cross-gradient, and KAFB-13 is 3,500 ft west-northwest upgradient. Depth to groundwater is estimated to be 350 ft below grade; however, shallower perched water zones may occur. Hydraulic conductivity within HR1 is estimated at 2 to 171 ft/day.

Oil/Water Separator, Buildings 481 and 482
(Formerly KAFB Site No. ST-219, Part of SWMU No. 10-7)

This OWS, removed in October 1994, was outside, adjacent to the flightline between Buildings 481 and 482 in the western portion of Kirtland AFB. This area of the flightline was sometimes used for aircraft washing. During the Stage 2B RFI field investigation in April-July 1994, the field sampling team observed large cracks in the north wall of the OWS. These cracks had allowed fluids to enter the surrounding soil. The northern portion of the unit had reportedly dropped 3 in. by undermining due to water

piping. The OWS was concrete, had a metal grate cover, and was 9 ft x 7.6 ft x 7 ft. Inflow was from a drain in the flightline about 65 ft southeast. A second inflow line connected to a floor drain in a nearby hazardous materials storage unit. Although the storage unit is still operational, site personnel have indicated the floor drain has been plugged. There have been no known discharges from this storage unit to the OWS. Discharge from the OWS was northeast to a sanitary sewer line. The discharge line had a shutoff valve about 12 ft away from the OWS. When the OWS was removed, a bypass connecting the area drain to the sanitary sewer was installed. No soil samples were collected during the OWS removal.

This area of ST-70 is underlain by unconsolidated alluvial sediment that ranges from clay to gravel. The uppermost 25 ft is predominantly very fine-grained to fine-grained sand and silty sand with occasional 2-ft to 3-ft-thick gravel and clay layers. Below a depth of 25 ft, coarser grained materials become more prevalent and bed thickness apparently increases. Several silty clay, clayey silt, and clay horizons underlie this area and apparently act as aquitards. It is possible that the deeper boreholes drilled to more than 100 ft at this site, penetrated into the uppermost Santa Fe Group sediments that presumably underlie this area. In boreholes adjacent to the OWS, it is probable that backfill material is present to a depth at least equal to the OWS depth.

Groundwater beneath this area is found within the Upper Santa Fe sediments and is generally thought to be unconfined in the upper portion of the aquifer. This area is within the HR1 saturated zone setting as defined by SNL studies. Hydrogeologic characterization in this portion of Kirtland AFB is complicated by the presence of numerous production wells. It is probable that uniform groundwater conditions do not exist in this region. Local cones of depression associated with groundwater withdrawal have altered the groundwater flow direction in the vicinity of the well fields.

The gradient is probably northeast at this site. Two production wells are located near this OWS: KAFB-12 is cross-gradient 2,150 ft northwest and KAFB-14 is cross-gradient 1,550 ft southeast. Depth to groundwater is estimated to be 350 ft below grade; however, shallower perched water zones may occur. Hydraulic conductivity within HR1 is estimated at 2 to 171 ft/day.

Summary of Previous Investigations

Oil/Water Separator, Holding Tank, and Fuel Filter Rack, Building 377
(Formerly KAFB Site No. ST-210, Part of SWMU No. 10-7)

As part of the Stage 2B RFI, 11 Geoprobe boreholes were drilled and sampled. Eight boreholes were located as close as possible to OWS and holding tank inflow and

outflow points, and three boreholes were drilled in the fuel filter drying rack area. A minimum of two sample intervals were collected in each borehole. OWS sample intervals consisted of one at a depth equal to and the other 5 ft below the base of the unit (i.e., 7 and 12 ft below grade). Holding tank sample intervals were 3 and 10 ft below the holding tank base (i.e., 8 and 15 ft below grade). Fuel filter drying rack samples were collected at depths 1 and 5 ft below grade.

In boreholes ST-210-07 and ST-210-08, the Geoprobe was used to collect deeper samples in an attempt to define the vertical extent of contamination. Field-screening of the deepest sample collected with the Geoprobe (55- to 57-ft in borehole ST-210-08) indicated contaminants were still present. The Geoprobe was unable to collect samples any deeper than the 55- to 57-ft sample interval. A hollow-stem auger (HSA) drill rig was used to drill and sample deeper than 57 ft, attempting to define the vertical extent of contamination at ST-210. Borehole ST-210-12 was drilled and sampled to a depth of 153 ft below grade. This borehole was located as close as possible to ST-210-03.

Organic Compounds

The VOC analytes detected in one or more of the soil samples collected at ST-210 were acetone, benzene, chlorobenzene, ethylbenzene, methylene chloride, 1,1,2,2-tetrachloroethane, tetrachloroethylene, trichloroethylene, toluene, and xylenes (total). The detections of acetone, methylene chloride, and toluene at the fuel filter drying rack boreholes (ST-210-09, ST-210-10, ST-210-11) may be the result of laboratory contamination as discussed in Section 3.5.1 of the Stage 2B RFI (USAF, 1995). All detected VOC concentrations were below HHRB action levels

The SVOC analytes detected in one or more of the soil samples collected at ST-210 were bis(2-ethylhexyl)phthalate, dibenzofuran, fluorene, 2-methylnaphthalene, naphthalene, phenanthrene, and phenol. All detected SVOC concentrations were below HHRB action levels.

Petroleum Hydrocarbons

Diesel and gasoline range hydrocarbons were detected in most samples at this site. Gasoline range hydrocarbon concentrations ranged from non-detect (ND) to 24,000 mg/kg. Diesel range hydrocarbon concentrations ranged from ND to 3,600 mg/kg. TPH concentrations that exceeded the NMED action level of 100 mg/kg were found in soil samples collected from boreholes ST-210-03 and ST-210-04 and the respective resample boreholes ST-210-07 and ST-210-08. These concentrations extend to the 45- to 49-ft sample interval in borehole ST-210-08, where diesel range hydrocarbons were detected at 3,600 mg/kg and gasoline range hydrocarbons were detected at 150 mg/kg. Results from

the next sample interval (55 to 57 ft) showed a decrease in diesel range hydrocarbons to 12 mg/kg and gasoline range hydrocarbons to ND. This may indicate the depth of contamination at this location.

In borehole ST-210-12, samples were not collected above the 57- to 59-ft depth interval. No diesel or gasoline range hydrocarbons were detected in samples from 59 to 153 ft below grade (total borehole depth). This may indicate that the dense layer at a depth of 57 ft acts as an impermeable layer in this area.

At the fuel filter rack, diesel range hydrocarbons (0.54 to 2.1 mg/kg) were detected in all the samples collected (boreholes ST-210-09, ST-210-10, ST-210-11). These concentrations were all below the NMED action level of 100 mg/kg.

Metals

Beryllium (0.11 to 1.1 mg/kg) was detected in all samples. Most beryllium concentrations exceeded the HHRB action level of 0.2 mg/kg. Arsenic (0.38 to 2.5 mg/kg) was detected in all samples from borehole ST-210-12. These samples were analyzed using an inductively coupled plasma instrument that is more sensitive than the graphite furnace atomic absorption method used for all other samples. All arsenic detections exceeded the HHRB action level of 0.37 mg/kg. These beryllium and arsenic detections appear to be naturally occurring at Kirtland AFB.

Oil/Water Separator, Buildings 481 and 482
(Formerly KAFB Site No. ST-219, Part of SWMU No. 10-7)

As part of the Stage 2B RFI, six boreholes were drilled and sampled with a Geoprobe. Boreholes ST-219-02 through -04 were drilled adjacent to the OWS. Borehole ST-219-05 was drilled next to the outflow pipe and the cracks in the OWS wall. The sixth borehole, ST-219-06, was drilled adjacent to ST-219-05.

A HSA was used to drill and sample six deep boreholes at and around the OWS. Borehole ST-219-07 was drilled adjacent to the two Geoprobe boreholes on the north side of the OWS. Borehole ST-219-08 was drilled near the Geoprobe background sampling borehole ST-219-01. Boreholes ST-219-09, ST-219-10, ST-219 -11, and ST-219-12 were drilled at distances up to 70 ft away from the OWS. A maximum depth of 152 ft below grade was reached in borehole ST-219-07.

At a minimum, Geoprobe borehole samples were collected at depths equal to and 5 ft below the OWS base (i.e., 7 and 12 ft). However, because of noticeable odors, stained soil, and elevated PID/FID readings in most samples, an additional sample was

collected 15 ft below the OWS base (i.e., 22 ft). Geoprobe borehole ST-219-06 was drilled and sampled about every 10 ft to a depth of 107 ft. HSA boreholes were generally sampled every 10 ft to a depth of 102 ft, except for ST-219-07. This borehole was drilled near the cracked OWS wall and was sampled every 10 ft from 74 to 152 ft.

Organic Compounds

The following VOC analytes were detected in one or more of the soil samples collected at ST-219: acetone, benzene, bromomethane, carbon disulfide, 2-hexanone, chlorobenzene, trans-1,2-dichloroethene, ethylbenzene, methyl ethyl ketone, methyl isobutyl ketone, methylene chloride, styrene, tetrachloroethylene, toluene, trichloroethylene, and xylenes (total) (Table 6-1). Several VOCs (acetone, methyl ethyl ketone, methylene chloride, methyl isobutyl ketone, toluene, xylenes, ethylbenzene, chlorobenzene, and 2-hexanone), present at trace concentrations or as isolated detections, were also found in associated QC samples and may be the result of laboratory contamination as described in Section 3.5.1 of the Stage 2B RFI Report. Only tetrachloroethylene (0.003 to 7,200 mg/kg) and trichloroethylene (0.012 to 120 mg/kg) were detected at concentrations above the HHRB action levels of 12 mg/kg and 58 mg/kg, respectively. The VOC distributions at ST-219 are variable. The highest concentrations and greatest variety of VOCs were detected in the shallow (less than 26 ft deep) boreholes adjacent to the OWS and in borehole ST-219-09, about 25 ft northeast of the OWS. Several VOCs were detected in the deepest (100 to 102 ft) sample from borehole ST-219-09, and indicate that contamination extends deeper in this area.

The following SVOC analytes were detected in one or more of the soil samples collected at ST-219: bis(2-ethylhexyl)phthalate, di-n-butylphthalate, 2-methylnaphthalene, naphthalene, and phenol. All SVOC concentrations were below the respective HHRB action levels.

Petroleum Hydrocarbons

Diesel range hydrocarbons were detected in all boreholes drilled at this site except ST-219-10 and ST-219-12. The highest concentrations were measured in three boreholes: ST-219-05, ST-219-06, and ST-219-09. ST-219-05 and ST-219-06 were drilled near the cracked north wall of the OWS. ST-219-09 was drilled about 25 ft northeast of the OWS, near the hazardous waste storage area. Although diesel contamination was detected to a depth of 107 ft in borehole ST-219-06, it apparently did not extend below approximately 92 ft in adjacent borehole ST-219-07. Diesel range hydrocarbons were detected in all the samples collected from borehole ST-219-09, drilled northeast of the OWS near the hazardous waste storage area. These deep detections indicate that contamination extends from about 10 ft to at least 102 ft below grade. The diesel concentration (49,000 mg/kg)

measured in the 100- to 102-ft sample of borehole ST-219-09 was the highest concentration detected in all the samples collected at ST-219. Diesel hydrocarbons were not detected in borehole ST-219-12 drilled further northeast of borehole ST-219-09.

Southwest of the OWS, diesel range hydrocarbons were detected in the 7- to 9-ft and 12- to 16-ft samples from the background sampling borehole ST-219-01. However, in the adjacent 102-ft-deep borehole ST-219-08, diesel range hydrocarbons were detected in only the 70- to 72-ft sample and replicate (8,500 and 6,000 mg/kg, respectively). Southeast of the OWS, diesel range hydrocarbons were detected to a depth of about 40 ft in borehole ST-219-11, located by the area drain on the flightline. Diesel hydrocarbons were not detected in borehole ST-219-10 drilled northwest of the OWS.

Gasoline range hydrocarbons appear to be laterally restricted to the area immediately adjacent to the OWS. Gasoline hydrocarbons were detected in only the boreholes adjacent to the OWS (ST-219-02, ST-219-03, ST-219-04, ST-219-05, and ST-219-06). The deepest detection (56 mg/kg) was found in the 105- to 107-ft sample from borehole ST-219-06. No gasoline range hydrocarbons were detected in adjacent borehole ST-219-07, where samples were collected from a depth of 72 to 152 ft.

On the basis of the hydrocarbon distributions, contaminants appear to have migrated east-northeast to the vicinity of borehole ST-219-09, and possibly southwest to the vicinity of borehole ST-219-08. However, the detections at ST-219-08 and ST-219-01 may be unrelated to the OWS release. The detections at borehole ST-219-11 may be related to a release from the area drain or drain discharge line.

An estimate of the diesel hydrocarbon contaminant mass present in the subsurface soil at ST-219 was calculated in the Stage 2B RFI Report. The diesel contaminant mass was estimated at 32,400 to 46,000 kg; equivalent to a volume of 46,200 to 65,900 liters. This calculation will be refined based on the results of the Phase II RFI additional work.

Metals

Several metals were detected at concentrations above the UTL but below the HHRB action levels. These included: barium (up to 1,820 mg/kg) in the 7- to 11-ft sample from borehole ST-219-02; chromium (up to 92 mg/kg) in samples from boreholes ST-219-02, ST-219-03, ST-219-04, ST-219-06, and ST-219-10; cobalt (up to 55 mg/kg) in boreholes ST-219-04, ST-219-06, and ST-219-12; zinc (up to 401 mg/kg) in boreholes ST-219-02, ST-219-06, and ST-219-07; copper (up to 158 mg/kg) in borehole ST-219-02; vanadium (up to 49.9 mg/kg) in borehole ST-219-02; and lead (up to 83.2 mg/kg) in borehole ST-219-04. Beryllium (ND to 1.4 mg/kg), arsenic (ND to 8.9 mg/kg), and manganese (37.8 to 760 mg/kg) were detected in several boreholes at concentrations

above their HHRB action levels. These concentrations of beryllium, arsenic, and manganese appear to be naturally occurring throughout Kirtland AFB.

Summary of Future RFI Activities

The following is a summary of planned Appendix II Phase 2 RFI activities that will be performed at these to sites within ST-70:

Table 1. Proposed Additional Sampling for OWS and Holding Tank, Building 377

Data Needs	Investigative Technique	Location	Number of Samples	Analyses[a]	Selected Analytical Option[b]
Determine lateral and vertical extent of release	Drill 6 to 12 boreholes with a Geoprobe; collect five samples per borehole at 15, 25, 35, 45, and 55 ft. Only the 25, 35 and 55-ft samples will be submitted for fixed-base laboratory analysis.	Six boreholes will be located in a circular pattern with a 25-ft radius from the OWS. If necessary, up to an additional six boreholes will be located in a circular pattern with a 50-ft radius.	36	VOCs SVOCs TPH (Rush) TPH Metals Soil pH Soil moisture	Level II Level II Level I Level II Level II Level I Level I
Confirm the vertical extent of release and need for monitor well installation	Drill three boreholes with a hollow-stem auger or rotary drill rig; collect samples at 10-ft intervals from 50 to 150 ft. Only five sample intervals per borehole will be submitted for fixed base laboratory analysis. Selection will be based on TRPH screening results.	Borehole locations will be based on the results for Phase I. The first borehole will be drilled at the location of the greatest concentrations, or deepest contamination.	15	VOCs SVOCs TPH (Rush) TPH Metals Soil pH Soil moisture	Level II Level II Level I Level II Level II Level I Level I

[a] VOCs — SW-8240 SVOCs - SW-827o
TPH — SW-8015 CA modified Metals - SW-6010
Soil pH — SW-9045 Soil moisture — ASTM 2217

[b] Refers to the type of data package from the analytical laboratory. Level I/Level II data packages are defined by the AFCEE contract; the Level II report is equivalent to an EPA CLP report.

Table 2. Proposed Additional Sampling for OWS and Area Drain, Buildings 481 & 482

Investigation Phase	Data Needs	Investigative Technique	Location	Number of Samples	Analyses[a]	Selected Analytical Option[b]
I	Determine lateral and vertical extent of release from the area drain and piping system.	Drill six boreholes with a Geoprobe; collect five samples per borehole at 10, 20, 30, 40, and 50 ft. Only the 20-, 30- and 50-ft samples will be analyzed. If contamination extends below 50 ft, an HSA or rotary drill rig will be used to obtain samples at greater depth.	Six boreholes will be located around the area drain and along the piping to the OWS.	18	VOCs SVOCs TPH (Rush) TPH Metals Soil pH Soil moisture	Level II Level II Level I Level II Level II Level I Level I
II	Define the vertical extent of release and need for monitor well installation.	Drill nine boreholes with an HSA or rotary drill rig; collect samples at 10-ft intervals from 10 to 150 ft. Eight sample intervals per borehole will be submitted for analysis.	Nine boreholes will be located at 25 to 75 ft. ST-219B-27 will be drilled contamination for in the area of deepest suspected evaluation.	72	VOCs SVOCs TPH (Rush) TPH Metals Soil pH Soil moisture	Level II Level II Level I Level II Level II Level I Level I

a VOCs — SW-8240
SVOCs — SW-8270
TPH — SW-8015 CA modified
Metals — SW-6010
Soil pH — SW-9045
Soil moisture — ASTM 2217

b Refers to the type of data package from the analytical laboratory. Level I/Level II data packages are defined by the AFCEE contract; the Level II report is equivalent to an EPA CLP report.

Qualitative Assessment of Potential Risks

The Stage 2B RFI Report identified potential risks that will be further investigated as part of the Phase 2 RFI currently being conducted. The following summary table identifies the risks and compares them to factors included within the RCRA/HSWA permit as being important when considering use of early actions to achieve risk reduction:

Table 3. ST-70 Risk Comparison to Risk Factors in the RCRA/HSWA Permit

	RCRA/HSWA Permit Risk Factor			
Stage 2B RFI Report Findings	**Actual or Potential Exposure to Human or Animal Populations**	**Contamination Potential to Drinking Water or Ecosystems**	**Potential for the Continuing Degradation of the Environment**	**Potential Weather-Induced Release or Migration of Existing Contamination**
COCs above HHRB action levels	X			X
Vertical extent of contamination not delineated		X	X	X
Horizontal extent of contamination not delineated			X	
Contamination detected at depths that could potentially impact the aquifer	X	X		X
Production wells near ST-210: KAFB-14/1,700 ft E, KAFB-12/2,800 ft N-NW, & KAFB-13/ 3,500 ft W-NW	X	X		
Production wells near ST-219: KAFB-12/ 2,150 ft NW & KAFB-14/1,550 ft SE	X	X		

Kirtland AFB looks forward to our continuing partnering efforts and hopes the public gains a better understanding of the current situation at these ST-70 sites and the potential risks that have been identified. Through on-going studies of the nature and

extent of contaminants as well as consideration of expedited actions to achieve early risk reduction, Kirtland AFB believes that all stakeholders will recognize significant progress towards the understanding of site conditions and the necessary planning that will ultimately result in site closure.

Please call me at (505) 846-0053 if you have any questions or need additional information.

Sincerely

CHRISTOPHER B. DeWITT, R.P.G.
Chief, Restoration Branch
Environmental Management Division

cc:
NMED-HRMB (Mr. Pullen)
EPA Region 6 (Ms. Morlock)