ATTACHMENT A

December 16, 2005 Multiple-Site Investigation Report submitted by Apex Environmental, Inc. to Mark McCann

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December 16, 2005

Mr. Mark McCann
McCann Resources, Inc.
4100 S.E. Adams Road, Suite C-105
Bartlesville, OK 74006

SUBJECT: Multiple-Site Environmental Inspection Report

Mr. McCann:

Enclosed, please find a copy of the revised assessment report, initially submitted May 6, 2005, and revised subsequent to the provisions outlined in a settlement conference of September 12, 2005 between McCann Resources and the EPA.

The revised report includes additional locations and topics provided by Mr. John Horst in a September 16, 2005 correspondence.

Please let me know if you have any questions or need anything further, regarding this report.

Sincerely,
Apex Environmental, Inc.

Terry Cochran

Terry Cochran
Project Manager

PURPOSE

This report is a written document that is designed to address environmental and operational concerns identified by the EPA Region VI offices in Dallas, Texas regarding crude oil production leases operated by McCann Resources, Inc. (McCann) in Osage County, Oklahoma. It takes into consideration issues associated with brine releases and the associated soil salinity concerns, physical integrity of operational equipment, as well as issues associated with Spill Prevention Control and Countermeasure (SPCC) Plans, as mandated by federal EPA guidelines under 40 CFR 112 (*specifically 112.13b – Oil production facility drainage*).

To this end, each McCann facility that Apex visited was inspected, photographed, and (in some cases) soil samples were collected to assess any environmental impact associated with historical brine releases.

CONTENTS

This report provides the name and location of each facility. Each facility's site assessment then provides the following:

- A basic statement regarding the current compliance condition of the facility's SPCC plan;
- A photo-based review of the facility, it's equipment, and general compliance condition;
- An analysis of the test results for those facilities, where soil samples were collected (regarding salinity in the soil); and
- A conclusion of what an effective path forward would be for that facility – towards attaining environmental compliance.

LIST/ORDER OF SITES

The following list breaks down the order of locations, as they are covered in this report:

FACILITIES

- Boulanger Facility
- Bockius Facility
- Bowring Facility
- Butler Creek Facility
- Culver Facility
- Culver Disposal Well #13
- Domes Facility
- Horton Facility
- Mullendore Facility
- Parker Facility
- Roark Facility
- Thunderbolt & North Hickory Facilities
- Whitmier Facilities

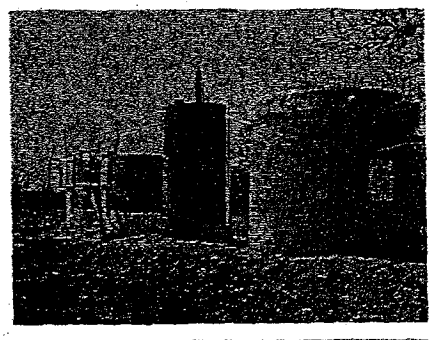
RELEASE SITES

- Parker Release Site #1
- Parker Release Site #2
- Stream Release Point
- Culver # 9 Well Site
- Mullendore Ranch Salt Water Facility
- Horton Release Site

LOCATION SW ¼ 27-28N-10E

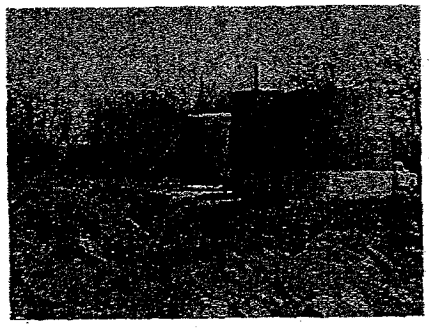
GENERAL ASSESSMENT With one (1) 200-barrel brine tank and two (2) 100-barrel oil tanks, the facility requires a current and accurate SPCC plan. Present SPCC documents may require updating to meet current regulations and guidelines, and current facility conditions also require updating and improvement.

DETAILS The following photos and photo-specific comments provide details regarding the facility's needed updates and compliance efforts:



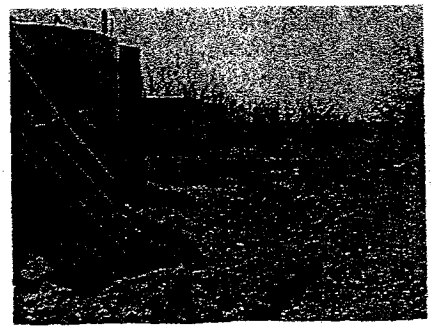
FINDINGS:
Secondary containment provided by trench and berm constructed on the down-slope side of the tank battery.

SUGGESTIONS/SOLUTIONS:
Updates to grading and the quality of diking (materials/design) would improve both the integrity of the diking and potential containment capability.



FINDINGS:
The interior of the secondary containment area has no obvious form of liner or impervious material on the ground, for the purpose of preventing spills from seeping into the ground. However, the presence of standing water within the bermed area suggests permeability may be sufficiently low to contain spills.

SUGGESTIONS/SOLUTIONS:
The addition of a non-absorbent and/or non-liquid-conducting liner or material to the floor of the secondary containment area is recommended to prevent spills from seeping into the subsurface.



FINDINGS:
Inconsistent topography within the diked area and inconsistent height of diking presents a minor concern.

SUGGESTIONS/SOLUTIONS:
If necessary, minor grading may be used to ensure height of diking is level around the perimeter of the tank battery, especially on the down-slope side.

FINDINGS:
Faded paint and rust indications observed on metal storage tanks.

SUGGESTIONS/SOLUTIONS:
Re-painting each vessel would provide both aesthetic and operational improvement to the storage vessels.

FINDINGS:
Wide-angle shot shows sloping of facility for reference to conditions for SPCC concerns. Also, a lack of fencing around the facility is evident during the March 2005 site visit.

SUGGESTIONS/SOLUTIONS:
The addition of a perimeter fence was recommended to improve security. **McCann reports the facility has been fenced.**

TEST RESULTS

There was no distressed vegetation or standing free product, outside of the diking area; therefore, no samples were collected and no analyses were conducted.

CONCLUSION

While steps to maintain operational capability are evident, an increased effort to meet environmental compliance is suggested.

With the combination of improvements needed (for SPCC purposes) and in the implementation of improved general housekeeping of the facility, a variety of basic steps are recommended.

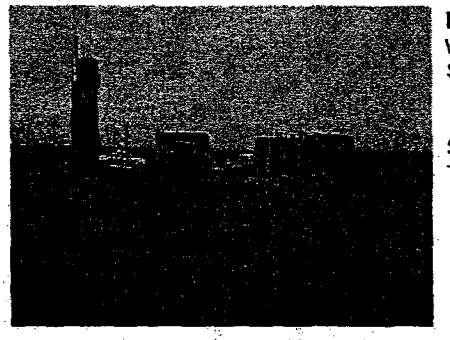
This includes:

- Painting of the tanks;
- Regrading and improving the diking and the materials that they are composed of (Example: Adding bentonite to the diking); and
- Providing some form of lining (or lining material - like bentonite) for the floor/ground inside the diked areas.

LOCATION SE ¼ 25-27-11

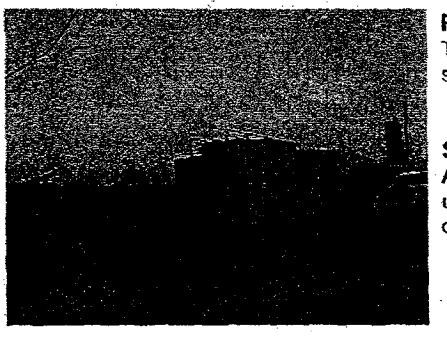
GENERAL ASSESSMENT With one (1) 200-barrel brine tank and three (3) 200-barrel oil tanks, the facility requires a current and accurate SPCC plan. Present SPCC documents may require updating to meet current regulations and guidelines, and current facility conditions also require updating and improvement.

DETAILS The following photos and photo-specific comments provide details regarding the facility's needed updates and compliance efforts:



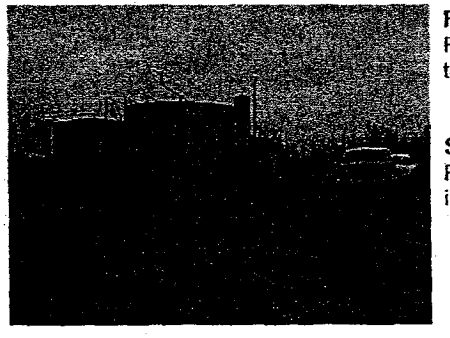
FINDINGS:
Wide-angle shot shows sloping of facility for reference to conditions for SPCC concerns. Also, a lack of fencing around the facility is evident.

SUGGESTIONS/SOLUTIONS:
The addition of a perimeter fence is recommended to improve security.



FINDINGS:
The facility does not have diking on the up-slope (north) side of the storage tank area.

SUGGESTIONS/SOLUTIONS:
Although, a release is not expected to escape the bermed area on the upslope side, minor diking on the north side of the facility could help to divert overland runoff from entering the secondary containment area.

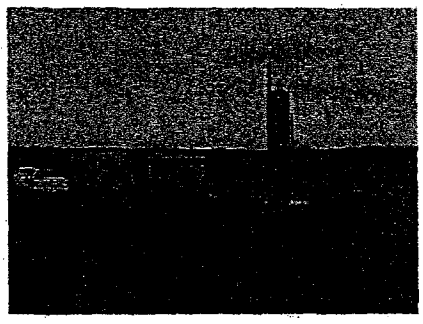


FINDINGS:
Faded paint and rust indications were observed on metal storage tanks.

SUGGESTIONS/SOLUTIONS:
Re-painting each vessel would provide both aesthetic and operational improvement to the storage vessels.

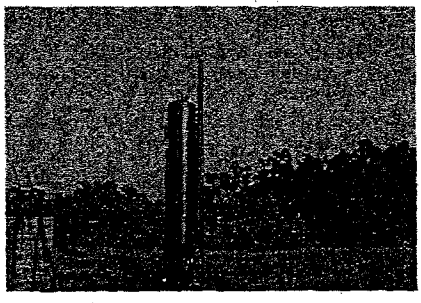
FINDINGS:
The interior of the secondary containment area has no obvious form of liner or impervious material on the ground, for the purpose of preventing spills from seeping into the ground. However, the presence of standing water within the bermed area suggests permeability may be sufficiently low to contain spills.

SUGGESTIONS/SOLUTIONS:
The addition of a non-absorbent and/or non-liquid-conducting liner or material to the floor of the secondary containment area is recommended to prevent spills from seeping into the subsurface.



FINDINGS:
Wide-angle shot shows sloping of facility for reference to conditions for SPCC concerns. Also, a lack of fencing around the facility is evident. **Rusted separator, in this view, was repainted in February 2005.**

SUGGESTIONS/SOLUTIONS:
The addition of a perimeter fence is recommended to improve security.



SITE IMPROVEMENTS:
In July 2005, separator tank was repainted.

TEST RESULTS

There was no distressed vegetation or standing free product, outside of the diking area; therefore, no samples were collected and no analyses were performed.

CONCLUSION

While steps to maintain operational capability are evident, an increased effort to meet environmental compliance is suggested.

With the combination of improvements needed (for SPCC purposes) and in the implementation of improved general housekeeping of the facility, a variety of basic steps are recommended.

This includes:

- Painting of the tanks, if required (although, **the rusted separator was repainted in July 2005**, the steel storage tanks may also require repainting);
- Improving facility security with appropriate fencing;

- Regrading and improving the diking and the materials that they are composed of (Example: Adding bentonite to the diking); and
- Providing some form of lining (or lining material - like bentonite) for the floor/ground inside the diked areas.

LOCATION NE ¼ 28-28N-11E

GENERAL ASSESSMENT With one (1) 100-barrel brine tank and four (4) 100-barrel oil tanks, the facility requires a current and accurate SPCC plan. Present SPCC documents may require updating to meet current regulations and guidelines, and current facility conditions also require updating and improvement.

DETAILS The following photos and photo-specific comments provide details regarding the facility's needed updates and compliance efforts:

FINDINGS:
Wide-angle shot shows sloping of facility for reference to conditions for SPCC concerns. Also, insufficient fencing around the facility is evident.

SUGGESTIONS/SOLUTIONS:
The addition of a perimeter fence is recommended to improve security.

FINDINGS:
Faded paint and rust indications were observed on steel storage tanks during the site visit conducted in March 2005.

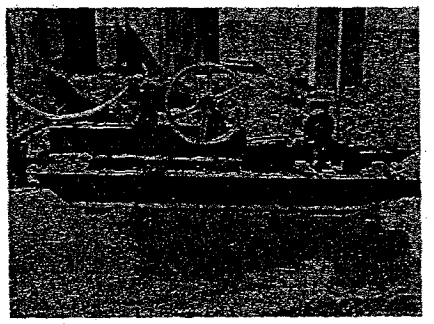
SUGGESTIONS/SOLUTIONS:
The tanks were repainted in July 2005.

FINDINGS:
The interior of the secondary containment area has no obvious form of liner or material along the ground, for the purpose of preventing spills from seeping into the ground. Although, individual sump pits have been lined with bentonite gel to contain minor petroleum drips and spills.

SUGGESTIONS/SOLUTIONS:
The addition of a non-absorbent and/or non-liquid-conducting liner or material to the floor of the secondary containment area is recommended.

FINDINGS:
Soil staining was observed inside the bermed area.

SUGGESTIONS/SOLUTIONS:
Identify the source of the release and perform necessary repairs. Steps to reclaim, recycle, and/or remediate the stained soil are also recommended.

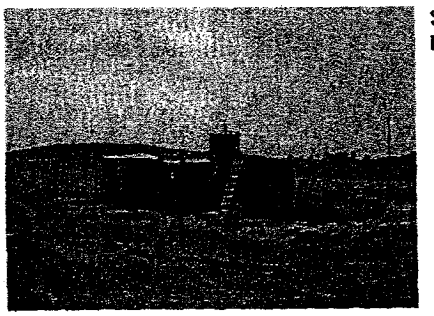


FINDINGS:
Soil staining was observed near a transfer pump.

SUGGESTIONS/SOLUTIONS:
Identify the source of the release and perform necessary repairs. Steps to reclaim, recycle, and/or remediate this stained soil are also recommended.

FINDINGS:
Soil staining is evident. Although, these sump pits are reportedly lined with bentonite gel specifically to contain minor product drips and spills.

SUGGESTIONS/SOLUTIONS:
Identify the source of the release (s) and perform necessary repairs. Steps to reclaim, recycle, and/or remediate the product and the stained soil are also recommended.

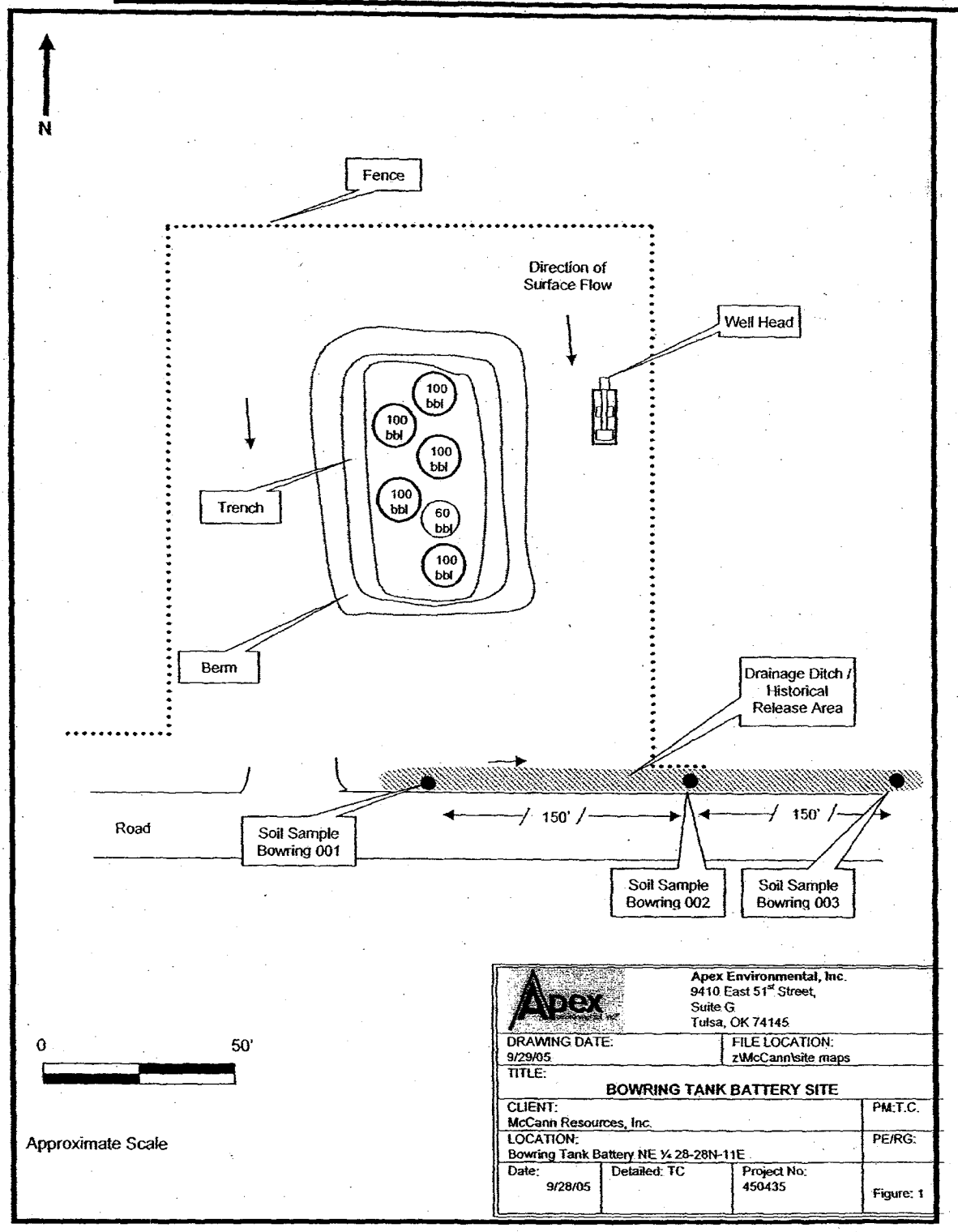


SITE IMPROVEMENTS:
In July 2005, the separator and tanks were repainted.

Additionally, oil production equipment on the Bowring lease was inspected on October 13, 2005 to assess any leaks or potential leaks associated with flow lines, connections, wellheads, saltwater pumps, and associated equipment. Seven producing wellheads, eight non-operating wellheads, one non-operating injection well, and one non-operating saltwater discharge pump were inspected. The condition of the equipment appeared to be within industry standards in the area. Fresh oil was observed at one wellhead and two minor leaks associated with valves and seals were observed. Recommendations to repair or replace the faulty fittings, equipment, etc. were made at that time and are included in the attached Mechanical Equipment Assessment Summary (**Attachment A**).

TEST RESULTS

There was no distressed vegetation or standing free product, outside of the diking area; therefore, no samples were collected and no analyses were performed during the March 2005 site visit. The site was revisited on September 28, 2005 and surface soil samples were collected from a drainage ditch located south of the tank battery site. An historical release of brine water entered the drainage ditch and was diverted to a creek south and east of the site. Three surface soil samples were collected for analysis of sodium (Na), calcium (Ca), magnesium (Mg), potassium (K), boron (B), electrical conductivity (EC), pH, total soluble salts (TSS), sodium adsorption ratio (SAR), potassium adsorption ratio (PAR), exchangeable sodium percentage (ESP), and exchangeable potassium percentage (EPP).


N
Fence
Direction of Surface Flow
Well Head
100 bbl
100 bbl
100 bbl
100 bbl
60 bbl
100 bbl
Trench
Berm
Drainage Ditch / Historical Release Area
Road
Soil Sample Bowring 001
150'
150'
Soil Sample Bowring 002
Soil Sample Bowring 003
0
50'
Approximate Scale
Apex Environmental, Inc.
9410 East 51st Street,
Suite G
Tulsa, OK 74145
DRAWING DATE: 9/29/05
FILE LOCATION: z\McCann\site maps
TITLE: BOWRING TANK BATTERY SITE
CLIENT: McCann Resources, Inc.
PM:T.C.
LOCATION: Bowring Tank Battery NE ¼ 28-28N-11E
PE/RG:
Date: 9/28/05
Detailed: TC
Project No: 450435
Figure: 1

Each sample consisted of a composite of three individual samples collected within a radius of approximately three feet at each sample location. A site sketch illustrating the approximate locations of the surface soil samples is included as **Figure 1**.

Although, the drainage ditch was almost completely re-vegetated, the analytical results indicated the TSS concentration at the 001 sample location is approximately four times higher than normal. TSS concentrations were within the normal range at sample locations 002 and 003 located further down gradient from the release site. A copy of the analytical laboratory report is included in **Attachment B**. The analytical results are summarized in the following table:

	Bowring Drainage Ditch		
Cations	Sample 001	Sample 002	Sample 003
Sodium (ppm)	2,509	562	319
Calcium (ppm)	387	22	43
Magnesium (ppm)	84	6	7
Potassium (ppm)	13	4	9
Derived Values			
Total Soluble Salts (TSS in ppm)	10,791	1,899	1,198
Sodium Adsorption Ratio (SAR)	30.1	27.4	11.8
Potassium Adsorption Ratio (PAR)	0.1	0.1	0.1
Exchangeable Sodium Percentage (ESP)	30.0	28.0	13.9
Exchangeable Potassium Percentage (EPP)	4.4	4.6	5.4
Other			
pH	7.0	8.3	8.0
EC (μmhos/cm)	16,350	2,877	1,815
Boron	0.07	0.12	0.05

CONCLUSION

Concentrations of TSS are approximately four times higher than normal in surface soil near the historical release site. However, the presence of vegetative cover in the area suggests the impacted soil is recovering naturally from the release.

While steps to maintain operational capability are evident, an increased effort to meet environmental compliance is suggested. **Steps to maintain operational capability were performed in July 2005 when the steel tanks were repainted**.

With the combination of improvements needed (for SPCC purposes) and in the implementation of improved general housekeeping of the facility, a variety of basic steps are recommended.

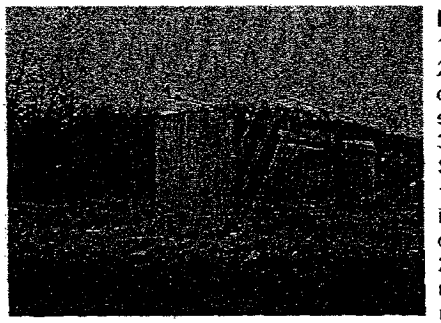
This includes:

- Identifying source (s) of historical product releases and making necessary repairs to storage vessels and associated ancillary equipment;
- Improving facility security with appropriate fencing;
- Regrading and improving the diking and the materials that they are composed of (Example: Adding bentonite to the diking).
- Identify source of releases and perform necessary repairs and initiate steps to reclaim, recycle, and/or remediate released product and stained soil.

LOCATION NE ¼ 29-27-12

GENERAL ASSESSMENT With one (1) 200-barrel brine tank and two (2) 200-barrel oil tanks, the facility requires a current and accurate SPCC plan. Present SPCC documents may require updating to meet current regulations and guidelines, and current facility conditions may also require updating and improvement.

DETAILS The following photos and photo-specific comments provide details regarding the facility's needed updates and compliance efforts:

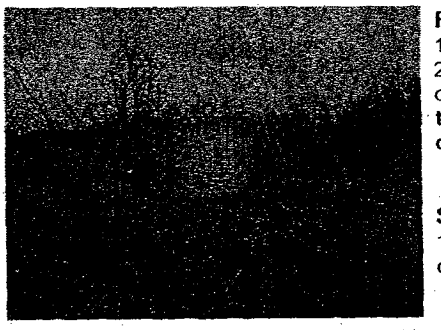


FINDINGS:
1. Inconsistent height of diking presents minor concern.
2. The interior of the secondary containment area has no form of liner or material on the ground, for the purpose of preventing spills from seeping into the ground.
3. A lack of fencing around the facility is evident.

SUGGESTIONS/SOLUTIONS:
1. If necessary, minor grading may be used to ensure height of diking is level around the perimeter of the tank battery, especially on the down-slope side.
2. The addition of a non-absorbent or non-liquid-conducting liner or material to the floor of the secondary containment area is recommended.
3. The addition of a perimeter fence is recommended to improve security.

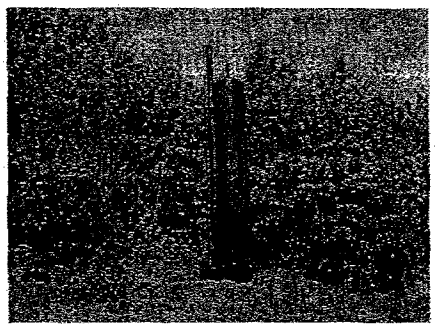
FINDINGS:
Photo taken from the edge of a creek (facing southwest), showing the relative proximity to a sensitive body of water.

SUGGESTIONS/SOLUTIONS:
Considerations for containment, regarding the creek should be made in both the SPCC plan and in general diking repairs/maintenance.



FINDINGS:
1. Faded paint and rust indications observed on metal storage tanks.
2. The facility's separator was placed outside of the secondary containment area when initially inspected in March 2005. **However, the separator was repainted and an earthen berm was constructed around the structure in July 2005.**

SUGGESTIONS/SOLUTIONS:
1. Re-painting each vessel would provide both aesthetic and operational improvement to the storage vessels.



SITE IMPROVEMENTS:
In July 2005, the separator tank was repainted and an earthen berm was constructed around the unit.

TEST RESULTS

There was no distressed vegetation or standing free product, outside of the diking area; therefore, no samples were collected and no analyses were performed.

CONCLUSION

Additional steps to maintain the operational capability and to meet environmental compliance were performed in July 2005 when the separator was repainted and an earthen berm was constructed around the unit.

With the combination of improvements needed (for SPCC purposes) and in the implementation of improved general housekeeping of the facility, a variety of basic steps are recommended.

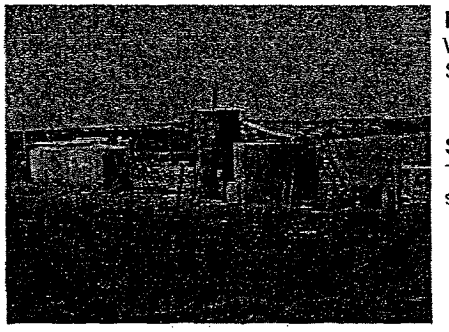
This includes:

- Painting of the tanks, as necessary;
- Improving facility security with appropriate fencing;
- Regrading and improving the diking and the materials that they are composed of (Example: Adding bentonite to the diking); and
- Providing some form of lining (or lining material - like bentonite) for the floor/ground inside the diked areas.

LOCATION NE ¼ 20-28N-10E

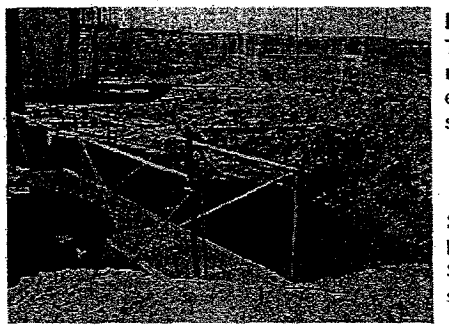
GENERAL ASSESSMENT The Culver tank battery includes one (1) 200-barrel brine tank and two (2) 100-barrel oil tanks. The facility requires a current and accurate SPCC plan. Present SPCC documents may require updating to meet current regulations and guidelines, and current facility conditions also require updating and improvement.

DETAILS The following photos and photo-specific comments provide details regarding the facility's needed updates and compliance efforts:



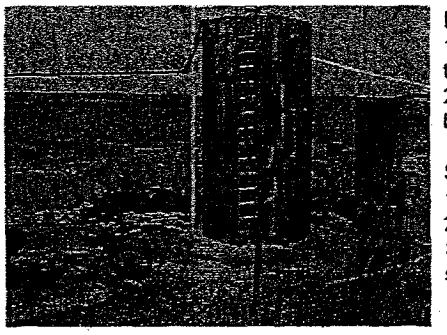
FINDINGS:
Wide-angle shot shows sloping of facility for reference to conditions for SPCC concerns. Also, fencing around the facility may need repairs.

SUGGESTIONS/SOLUTIONS:
The perimeter fence may require repairs and/or upgrades to improve security.



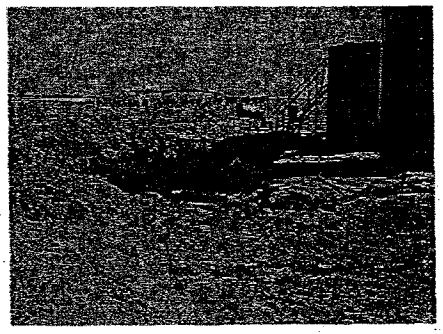
FINDINGS:
The facility has an alarm system to warn of major product releases; however, free-standing product from minor drips and spills is evident. This sump pit is lined with bentonite gel, specifically to contain such minor releases.

SUGGESTIONS/SOLUTIONS:
Identify the source of the release (s) and perform necessary repairs. Steps to reclaim, recycle, and/or remediate the product and the stained soil are also recommended.



FINDINGS:
1. Faded paint and rust indications were observed on metal storage tanks when initially inspected in March 2005.
2. Signs of standing product and stained soil were observed inside the bermed area.

SUGGESTIONS/SOLUTIONS:
1. **The steel tanks were repainted in July 2005.**
2. Identify the source of the release (s) and perform necessary repairs. Steps to reclaim, recycle, and/or remediate the product and the stained soil are also recommended.

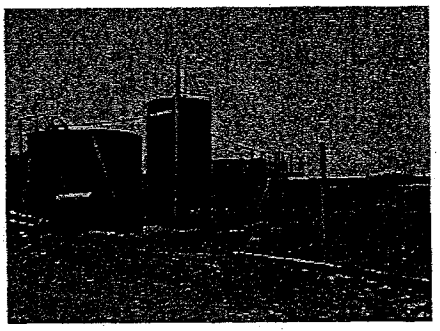


FINDINGS:
The interior of the secondary containment area has no form of liner or material on the ground, for the purpose of preventing spills from seeping into the ground.

SUGGESTIONS/SOLUTIONS:
The addition of a non-absorbent and/or non-liquid-conducting liner or material to the floor of the secondary containment area is recommended.

FINDINGS:
Signs of brine releases/salt deposits are evident within the containment area.

SUGGESTIONS/SOLUTIONS:
Identify the source of the release (s) and perform necessary repairs. Steps to reclaim, recycle, and/or remediate the stained soil are also recommended.



FINDINGS:
Inconsistent height of diking presents minor concern.

SUGGESTIONS/SOLUTIONS:
If necessary, minor grading may be used to ensure height of diking is level around the perimeter of the tank battery, especially on the down-slope side.

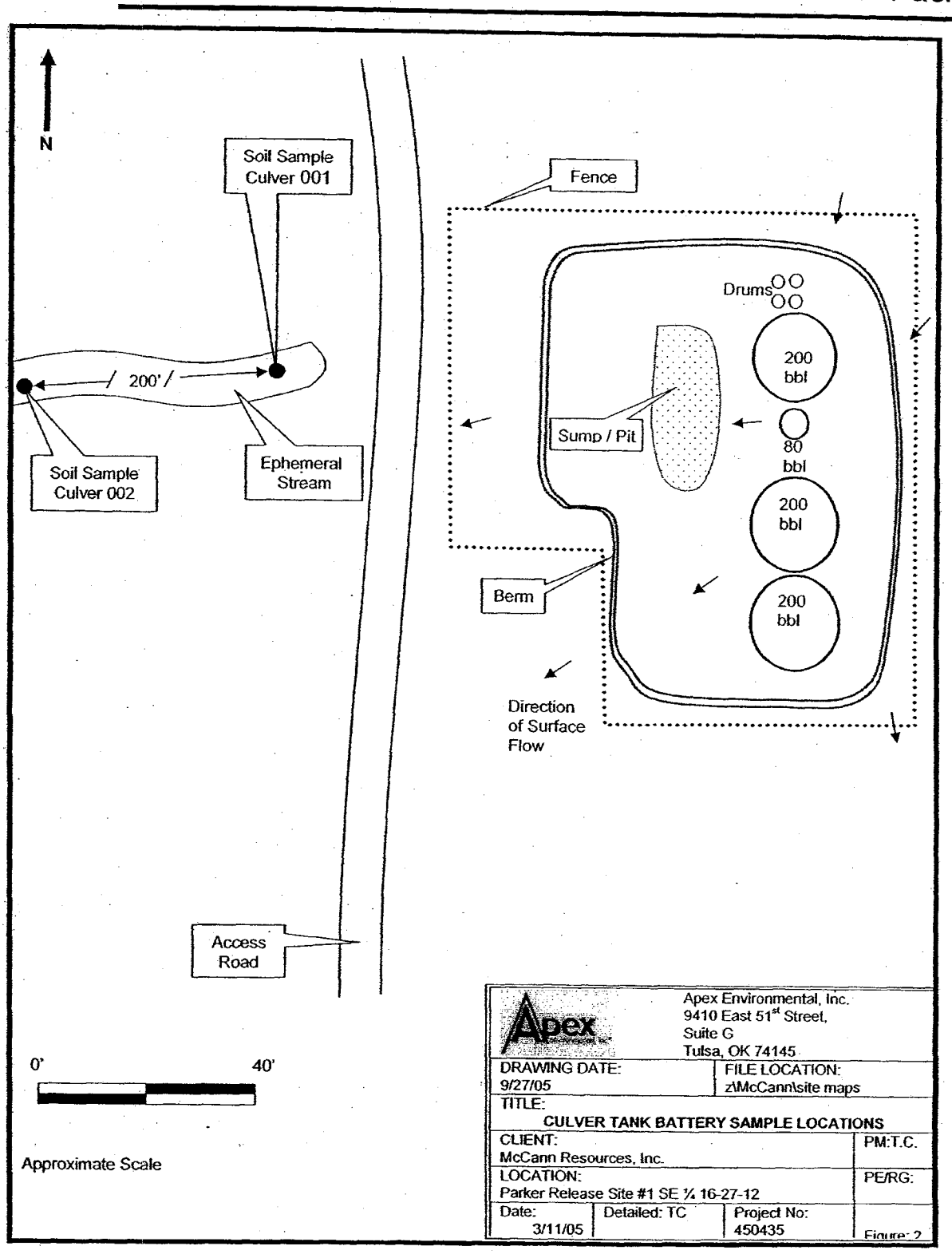
SITE IMPROVEMENTS:
The tanks were repainted in July 2005.

Additionally, oil production equipment on the Culver lease was inspected on October 20, 2005 to assess any leaks or potential leaks associated with flow lines, connections, wellheads, saltwater pumps, and associated equipment. Four producing wellheads, seven non-operating wellheads, two non-operating injection wells, and one tank battery were inspected. The condition of the equipment appeared to be within industry standards in the area. One minor leak associated with an oil seal was observed. Recommendations to repair or replace the faulty equipment, etc. were made at that time and are included in the attached Mechanical Equipment Assessment Summary (**Attachment A**)

TEST RESULTS

There was no distressed vegetation or standing free product, outside of the bermed area; therefore, no samples were collected and no analyses were performed during the March 2005 site visit. At the request of EPA Region VI, the site was revisited on September 28, 2005 and surface soil samples were collected from an ephemeral drainage ditch located immediately down gradient from the tank battery site. During an EPA site visit on November 2004, the EPA documented 12,000 ppm TSS in water collected in the drainage ditch. Two surface soil samples were collected for analysis of Na, Ca, Mg, K, B, EC, pH, TSS, SAR, PAR, ESP, and EPP.

Each sample consisted of a composite of three individual samples collected within a radius of approximately three feet at each sample location. The attached site sketch illustrates the locations of surface soil samples and other site structures.


N
Soil Sample Culver 001
Fence
Drums
200 bbl
200'
Sump / Pit
80 bbl
Soil Sample Culver 002
Ephemeral Stream
200 bbl
Berm
200 bbl
Direction of Surface Flow
Access Road
0'
40'
Approximate Scale
Apex Environmental, Inc.
9410 East 51st Street,
Suite G
Tulsa, OK 74145
DRAWING DATE: 9/27/05
FILE LOCATION: z\McCann\site maps
TITLE: CULVER TANK BATTERY SAMPLE LOCATIONS
CLIENT: McCann Resources, Inc.
PM:T.C.
LOCATION: Parker Release Site #1 SE ¼ 16-27-12
PE/RG:
Date: 3/11/05
Detailed: TC
Project No: 450435
Figure: 2

The analytical results indicated the TSS concentration at the 001 sample location is approximately five times higher than normal at the upstream location and approximately three times higher than normal at the downstream location. A copy of the analytical laboratory report is included in **Attachment B**. The analytical results are summarized in the following table:

	Culver Tank Battery Drainage Ditch	
Cations	Sample 001	Sample 002
Sodium (ppm)	4,238	2,174
Calcium (ppm)	203	245
Magnesium (ppm)	32	27
Potassium (ppm)	22	16
Derived Values		
Total Soluble Salts (TSS in ppm)	14,256	8,494
Sodium Adsorption Ratio (SAR)	72.9	35.2
Potassium Adsorption Ratio (PAR)	0.2	0.2
Exchangeable Sodium Percentage (ESP)	51.3	33.4
Exchangeable Potassium Percentage (EPP)	5.6	4.9
Other		
pH	7.9	8.1
EC (µmhos/cm)	21,600	12,870
Boron	0.48	0.27

CONCLUSION

One minor petroleum leak was detected at one of the operating wellheads on the lease. **Steps to maintain operational capability were performed in July 2005 when the steel tanks were repainted. The automated alarm system serves to maintain operational capability and environmental compliance.**

Elevated concentrations of TSS were detected in surface soil samples collected from the ephemeral drainage ditch located west of the tank battery. Steps to remediate the salt in the soil will also alleviate excessive erosion in that area.

With the combination of improvements needed (for SPCC purposes) and in the implementation of improved general housekeeping of the facility, a variety of basic steps are recommended.

This includes:

- Providing a means or method to improve spilled/released product recovery rates, efficiency, and effectiveness;
- Removing any fluid that accumulates in the containment area;
- Improving facility security with appropriate fencing;
- Regrading and improving the diking and the materials that they are composed of (Example: Adding bentonite to the diking); and
- Providing some form of lining (or lining material - like bentonite) for the floor/ground inside the diked areas.

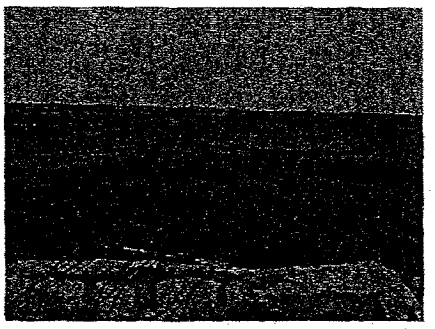
LOCATION NE ¼ 20-28-10

GENERAL ASSESSMENT A release occurred four and a half years ago when piping came off a fitting. Brine water was released for a day and a half. In conjunction, Apex's facility inspection located stressed vegetation, in a triangular shaped area measuring 400' x 415' x 110'.

Three (3) soil samples collected on March 11, 2005:

- C-001 approximately 50' south of disposal well.
- C-002 approximately 100' North Northwest of C-001.
- C-003 approximately 150' North Northwest of C-002. C-003 was collected from a dry creek bed north of the disposal well.

DETAILS The following photos and photo-specific comments provide details regarding the facility's needed updates and compliance efforts:

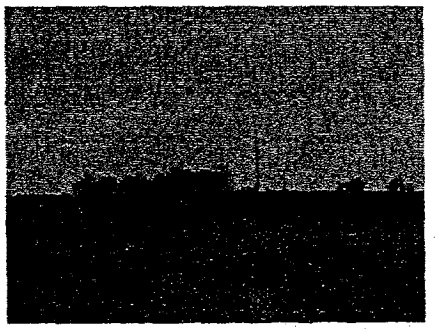


FINDINGS:
Facing the stressed vegetation (down-slope) from the disposal well, a clear view of the release area is represented.

SUGGESTIONS/SOLUTIONS:
A viable solution should be selected and implemented for treating the soil to return the vegetative capability of the soil.

FINDINGS:
This angle offers a more direct view of the disposal well.

SUGGESTIONS/SOLUTIONS:
N/A



FINDINGS:
Looking up-slope from the release area, towards the disposal well, this offers an alternate view of the location.

SUGGESTIONS/SOLUTIONS:
N/A

TEST RESULTS

The analytical results from the March 2005 sampling event indicate total soluble salts (TSS) in the samples ranged from 1,016 parts per million (ppm) in sample C-003 (collected from the dry creek bed north of the disposal well), to 18,553 ppm in sample C-001 (collected approximately 50 feet south of the disposal well). The concentration of 1,016 ppm TSS is within normal range for a productive soil. The concentration of 18,553 ppm TSS in sample C-001 is approximately seven times higher than normal and sufficiently high to reduce yield of even salt tolerant crops. A site sketch illustrating the approximate locations of the surface soil samples is included as **Figure 3**. A copy of the analytical laboratory report is included in **Attachment B**. A summary of the analytical results is included in the following table:

	Culver Disposal Well # 13		
Cations	Sample 001	Sample 002	Sample 003
Sodium (ppm)	4,126	3,260	261
Calcium (ppm)	1,003	316	14
Magnesium (ppm)	211	122	4
Potassium (ppm)	41	21	4
Derived Values			
Total Soluble Salts (TSS in ppm)	18,553	13,543	1,016
Sodium Adsorption Ratio (SAR)	30.9	39.5	16.0
Potassium Adsorption Ratio (PAR)	0.2	0.1	0.1
Exchangeable Sodium Percentage (ESP)	30.6	36.1	18.2
Exchangeable Potassium Percentage (EPP)	5.2	4.9	4.9
Other			
pH	6.5	5.3	6.2
EC (µmhos/cm)	28,110	20,520	1,539
Boron	0.23	0.11	0.05

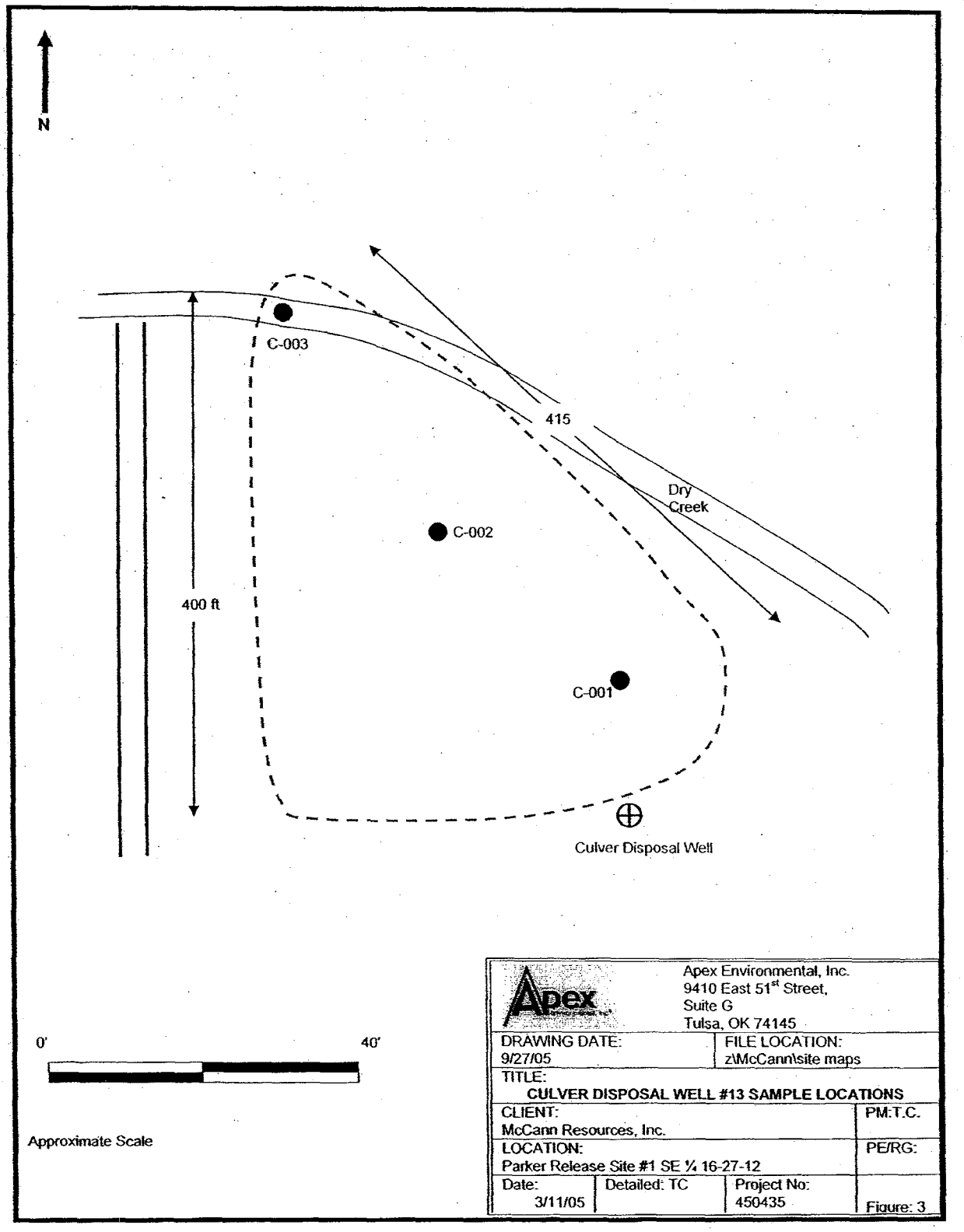
CONCLUSION

While steps to maintain operational capability are evident, an increased effort to meet environmental compliance is suggested.

This includes:

- Improving plant growth potential, by promoting the leaching of salt from the soil via infiltration of precipitation from normal rainfall events.

The Oklahoma Cooperative Extension Service Soil, Water, and Forage Analytical Laboratory recommends incorporation of organic matter into the upper six inches of soil to aid in the leaching of salts. Adding gypsum to the upper two inches of soil may aid in the removal of excess sodium. Salt tolerant crops such as barley or Bermuda grass may also be planted during the reclamation process to provide ground cover and minimize erosion.



Apex Environmental, Inc. 9410 East 51st Street, Suite G Tulsa, OK 74145			
DRAWING DATE: 9/27/05	FILE LOCATION: z\McCann\site maps		
TITLE: CULVER DISPOSAL WELL #13 SAMPLE LOCATIONS			
CLIENT: McCann Resources, Inc.			PM:T.C.
LOCATION: Parker Release Site #1 SE ¼ 16-27-12			PE/RG:
Date: 3/11/05	Detailed: TC	Project No: 450435	Figure: 3

LOCATION NE ¼ 9-26-10

GENERAL ASSESSMENT The tank battery facility has two (2) 200-barrel brine tank and two (2) 200-barrel oil tanks. The facility requires a current and accurate SPCC plan. Present SPCC documents may require updating to meet current regulations and guidelines, and current facility conditions may also require updating and improvement.

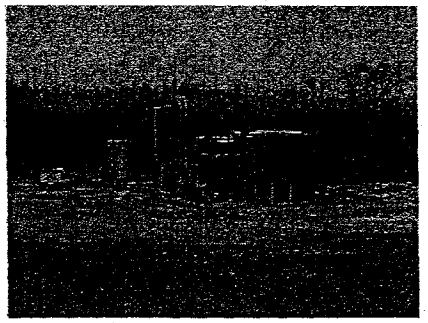
DETAILS The following photos and photo-specific comments provide details regarding the facility's needed updates and compliance efforts:

FINDINGS:
Wide-angle shot shows sloping of facility for reference to conditions for SPCC concerns. Also, potentially inadequate fencing around the facility is evident.

SUGGESTIONS/SOLUTIONS:
The addition or improvement of the perimeter fencing is recommended to improve security.

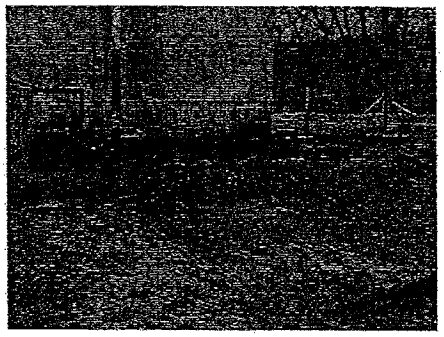
FINDINGS:
Significant staining is evident inside the bermed area.

SUGGESTIONS/SOLUTIONS:
Identify the source of the release (s) and perform necessary repairs. Steps to reclaim, recycle, and/or remediate the stained soil are also recommended.



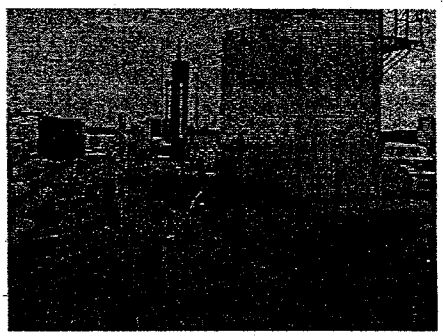
FINDINGS:
Faded paint and rust were observed on the steel storage tanks and separator when initially investigated in March 2005.

SUGGESTIONS/SOLUTIONS:
The steel tanks and the separator were re-painted in July 2005.



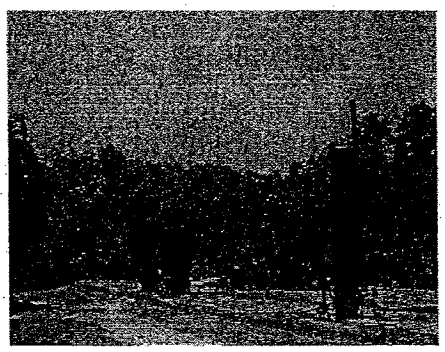
FINDINGS:
During the March 2005 site visit, diking for storage tank containment was eroded, resulting in a lack of secondary containment for the storage vessels.

SUGGESTIONS/SOLUTIONS:
A recommendation to repair the diking was included in the April 2005 report. **The containment berm was repaired in July 2005.**



FINDINGS:
1. Inconsistent height of diking presents minor concern.
2. The interior of the secondary containment area has no form of liner or material on the ground, for the purpose of preventing spills from seeping into the ground.

SUGGESTIONS/SOLUTIONS:
1. Updates to grading and the quality of diking (materials/design) would improve both the integrity of the diking and potential containment capability.
2. The addition of a non-absorbent and/or non-liquid-conducting liner or material to the floor of the secondary containment area is recommended.



SITE IMPROVEMENTS:
The separator and tanks were repainted in July 2005.

TEST RESULTS

There was no distressed vegetation or standing free product, outside of the diking area; therefore, no samples were collected and no analyses were performed.

CONCLUSION

Steps to maintain the operational capability and to meet environmental compliance were performed in July 2005 when the steel storage tanks and the separator were repainted and the containment berm was repaired. The facility's existing high level shut down system (automated) is another good example of this. Additional steps to meet environmental compliance are suggested.

With the combination of improvements needed (for SPCC purposes) and in the implementation of improved general housekeeping of the facility, a variety of basic steps are recommended.

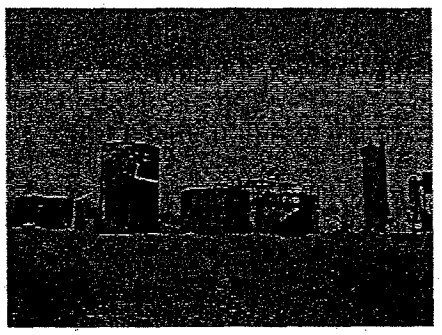
This includes:

- Identifying source(s) of historical spills and making necessary repairs;
- Providing a means or method to improve spilled/released product recovery rates, efficiency, and effectiveness;
- Implementing remediation of stained soil (including proper treatment and/or disposal procedures);
- Providing some form of lining (or lining material - like bentonite) for the floor/ground inside the diked areas.

LOCATION NE ¼ 17-29N-11E

GENERAL ASSESSMENT The Horton tank battery has one (1) 200-barrel and one (1) 100-barrel brine tank, two (2) 200-barrel oil tanks, and one (1) 65-barrel separator. The facility requires a current and accurate SPCC plan. Present SPCC documents may require updating to meet current regulations and guidelines, and current facility conditions may also require updating and improvement.

DETAILS The following photos and photo-specific comments provide details regarding the facility's needed updates and compliance efforts:



FINDINGS:
Faded paint and rust were observed on the steel storage tanks when initially investigated in March 2005.

SUGGESTIONS/SOLUTIONS:
The tanks were repainted in July 2005.

FINDINGS:
The interior of the secondary containment area has no form of liner or material along the ground, for the purpose of preventing spills from seeping into the ground. However the presence of standing water within the bermed area suggests permeability may be sufficiently low to contain spills.

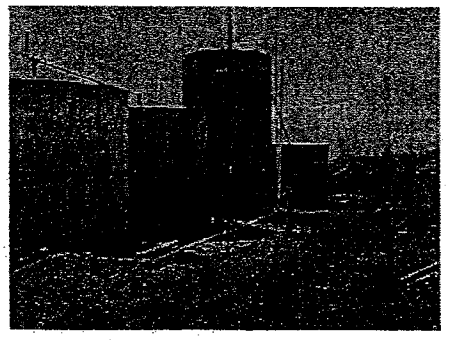
SUGGESTIONS/SOLUTIONS:
The addition of a non-absorbent and/or non-liquid-conducting liner or material to the floor of the secondary containment area is recommended.

FINDINGS:
Significant soil staining and product are evident inside the bermed area.

SUGGESTIONS/SOLUTIONS:
Identify the source (s) of the release and perform necessary repairs. Steps to reclaim, recycle, and/or remediate any product and stained soil are recommended.

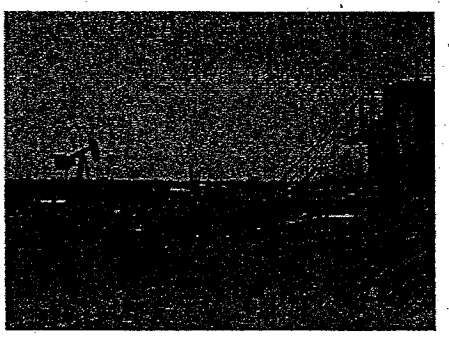
FINDINGS:
Stained soil and product is evident inside the bermed containment area.

SUGGESTIONS/SOLUTIONS:
Identify the source (s) of the release and perform necessary repairs. Recover/remove the free product. Initiate steps to reclaim, recycle, and/or remediate any product and stained soil.



FINDINGS:
1. Inconsistent height of diking presents minor concern.
2. The interior of the secondary containment area has no form of liner or material along the ground, for the purpose of preventing spills from seeping into the ground.

SUGGESTIONS/SOLUTIONS:
1. If necessary, minor grading may be used to ensure height of diking is level around the perimeter of the tank battery, especially on the down-slope side.
2. The addition of a non-absorbent and/or non-liquid-conducting liner or material to the floor of the secondary containment area is recommended.



FINDINGS:
Wide-angle shot shows sloping of facility for reference to conditions for SPCC concerns. Also, potentially inadequate fencing around the facility is evident.

SUGGESTIONS/SOLUTIONS:
The addition or improvement of the perimeter fencing is recommended to improve security.

Oil production equipment on the Horton lease was inspected on October 20, 2005 to assess any leaks or potential leaks associated with flow lines, connections, wellheads, saltwater pumps, and associated equipment. Six operational wellheads, seven non-operational wellheads, two operational injection wells, one operational tank battery, one non-operational tank battery, and one non-operational separator were inspected. The tank battery and equipment were freshly painted and appeared to be within industry standards in the area. Two minor leaks associated with equipment seals were observed. Recommendations to repair or replace the faulty equipment were made at that time and are included in the attached Mechanical Equipment Assessment Summary (**Attachment A**).

TEST RESULTS

There was no distressed vegetation or standing free product, outside of the diking area; therefore, no samples were collected and no analyses were performed.

CONCLUSION **Steps to maintain the operational capability and to meet environmental compliance were performed in July 2005 when the steel storage tanks and the separator were repainted. Liquids have also been removed from the containment area.** Additional steps to meet environmental compliance are suggested.

With the combination of improvements needed (for SPCC purposes) and in the implementation of improved general housekeeping of the facility, a variety of basic steps are recommended.

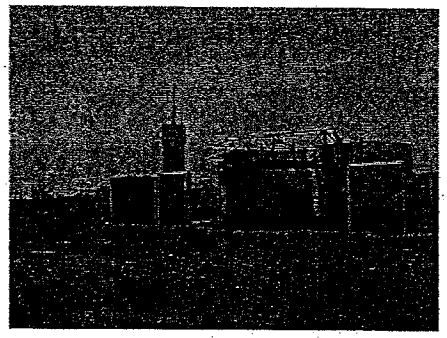
This includes:

- Identifying source(s) of historical spills and making necessary repairs;
- Providing a means or method to improve spilled/released product recovery rates, efficiency, and effectiveness;
- Implementing remediation of stained soil (including proper treatment and/or disposal procedures);
- Improving facility security with appropriate fencing;
- Regrading and improving the diking and the materials that they are composed of, as well as increasing potential containment volumes; and
- Providing some form of lining (or lining material - like bentonite) for the floor/ground inside the diked areas.

LOCATION NW ¼ 21-29N-11E

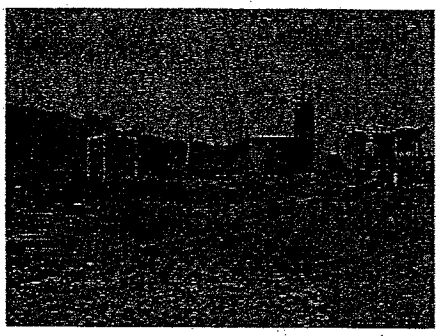
GENERAL ASSESSMENT The Mullendore tank battery has one (1) 110-barrel brine tank and two (2) 100-barrel oil tanks. The facility requires a current and accurate SPCC plan. Present SPCC documents may require updating to meet current regulations and guidelines, and current facility conditions may also require updating and improvement.

DETAILS The following photos and photo-specific comments provide details regarding the facility's needed updates and compliance efforts:



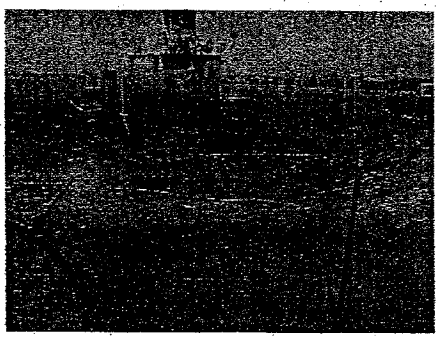
FINDINGS:
1. Inconsistent height of diking presents minor concern.
2. The interior of the secondary containment area has no form of liner or material along the ground, for the purpose of preventing spills from seeping into the ground.

SUGGESTIONS/SOLUTIONS:
1. If necessary, minor grading may be used to ensure height of diking is level around the perimeter of the tank battery, especially on the down-slope side.
2. The addition of a non-absorbent and/or non-liquid-conducting liner or material to the floor of the secondary containment area is recommended.



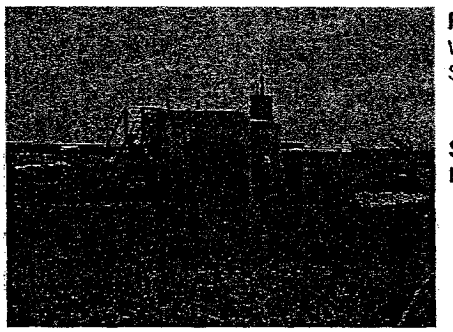
FINDINGS:
Faded paint and rust indications observed on metal storage tanks.

SUGGESTIONS/SOLUTIONS:
Re-painting each vessel would provide both aesthetic and operational improvement to the storage vessels.



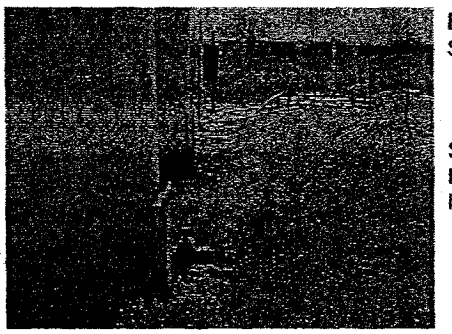
FINDINGS:
The interior of the secondary containment area has no form of liner or material along the ground, for the purpose of preventing spills from seeping into the ground. However, the presence of standing water within the bermed area suggests permeability may be sufficiently low to contain spills.

SUGGESTIONS/SOLUTIONS:
The addition of a non-absorbent and/or non-liquid-conducting liner or material to the floor of the secondary containment area is recommended to prevent spill fro seeping into the subsurface.



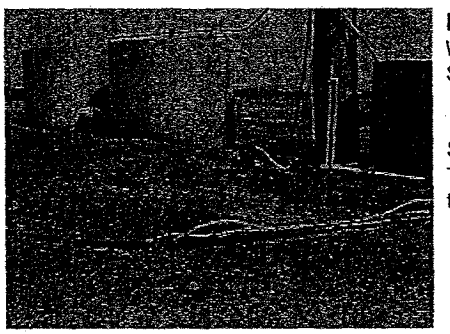
FINDINGS:
Wide-angle shot shows sloping of facility for reference to conditions for SPCC concerns.

SUGGESTIONS/SOLUTIONS:
N/A



FINDINGS:
Significant staining is evident.

SUGGESTIONS/SOLUTIONS:
Identify the source of the release and perform necessary repairs. Initiate steps to reclaim, recycle, and/or remediate the stained soil.



FINDINGS:
Wide-angle shot shows sloping of facility for reference to conditions for SPCC concerns.

SUGGESTIONS/SOLUTIONS:
The addition or improvement of the perimeter fencing is recommended to improve security.

TEST RESULTS

There was no distressed vegetation or standing free product, outside of the diking area; therefore, no samples were collected and no analyses were performed.

CONCLUSION

While steps to maintain operational capability are evident, an increased effort to meet environmental compliance is suggested.

With the combination of improvements needed (for SPCC purposes) and in the implementation of improved general housekeeping of the facility, a variety of basic steps are recommended.

This includes:

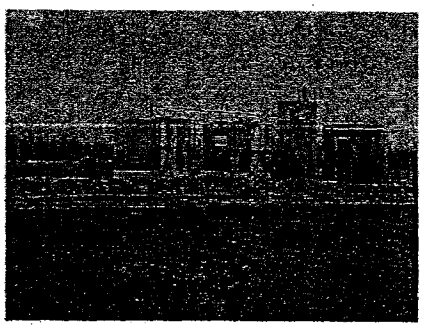
- Providing a means or method to improve spilled/released product recovery rates, efficiency, and effectiveness;
- Painting of the tanks;
- Removing rainwater from the collection sump;
- Implementing remediation of stained soil (including proper treatment and/or disposal procedures); and
- Regrading and improving the diking and the materials that they are composed of, as well as increasing potential containment volumes;

- Providing some form of lining (or lining material - like bentonite) for the floor/ground inside the diked areas.

LOCATION SW ¼ 15 & SE ¼ 16-27N-12E

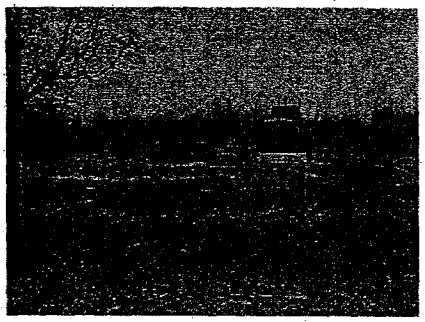
GENERAL ASSESSMENT The Parker tank battery has one (1) 210-barrel brine tank and two (2) 100-barrel oil tanks. The facility requires a current and accurate SPCC plan. Present SPCC documents may require updating to meet current regulations and guidelines, and current facility conditions may also require updating and improvement.

DETAILS The following photos and photo-specific comments provide details regarding the facility's needed updates and compliance efforts:



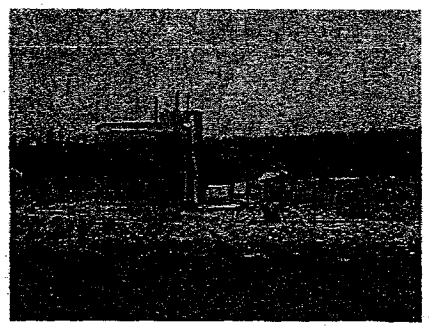
FINDINGS:
Wide-angle shot shows sloping of facility for reference to conditions for SPCC concerns.

SUGGESTIONS/SOLUTIONS:
N/A



FINDINGS:
Inconsistent height of diking presents minor concern.

SUGGESTIONS/SOLUTIONS:
If necessary, minor grading may be used to ensure height of diking is level around the perimeter of the tank battery, especially on the down-slope side.



FINDINGS:
The interior of the secondary containment area has no form of liner or material along the ground, for the purpose of preventing spills from seeping into the ground.

SUGGESTIONS/SOLUTIONS:
The addition of a non-absorbent and/or non-liquid-conducting liner or material to the floor of the secondary containment area is recommended.

FINDINGS:
Faded paint and rust indications observed on metal storage tanks.

SUGGESTIONS/SOLUTIONS:
Re-painting each vessel would provide both aesthetic and operational improvement to the storage vessels.

Oil production equipment on the Parker lease was inspected on October 13, 2005 to assess any leaks or potential leaks associated with flow lines, connections, wellheads, saltwater pumps, and associated equipment. Two operational wellheads, twenty-eight non-operational wellheads, and one non-operational tank battery were inspected. Eight minor leaks associated with equipment valves and seals were observed. Recommendations to repair or replace the faulty equipment were made at that time and are included in the attached Mechanical Equipment Assessment Summary (**Attachment A**).

TEST RESULTS

There was no distressed vegetation or standing free product, outside of the diking area; therefore, no samples were collected and no analyses were performed.

CONCLUSION

Steps to maintain operational capability are evident; however, an increased effort to meet environmental compliance is suggested.

With the combination of improvements needed (for SPCC purposes) and in the implementation of improved general housekeeping of the facility, a variety of basic steps are recommended.

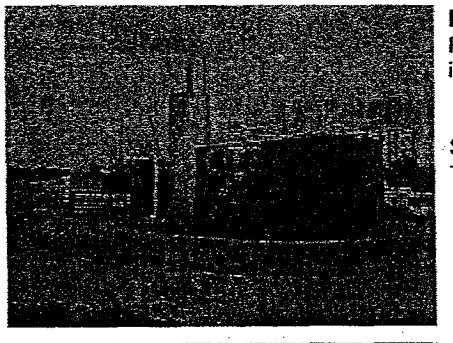
This includes:

- Painting of the tanks;
- Providing reuse, reclamation, or remediation of stained soil;
- Regrading and improving the diking and the materials that they are composed of, as well as increasing potential containment volumes; and
- Providing some form of lining (or lining material - like bentonite) for the floor/ground inside the diked areas.

LOCATION NE ¼ 10-26N-10E

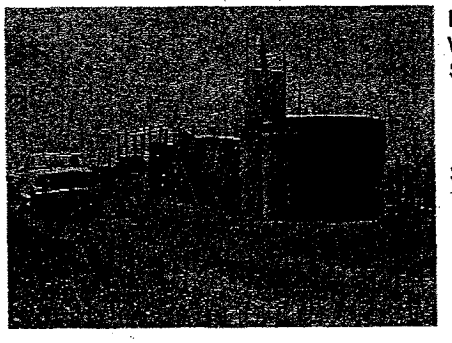
GENERAL ASSESSMENT The Roark tank battery has one (1) 100-barrel brine tank and two (2) 100-barrel oil tanks. The facility requires a current and accurate SPCC plan. Present SPCC documents may require updating to meet current regulations and guidelines, and current facility conditions may also require updating and improvement.

DETAILS The following photos and photo-specific comments provide details regarding the facility's needed updates and compliance efforts:



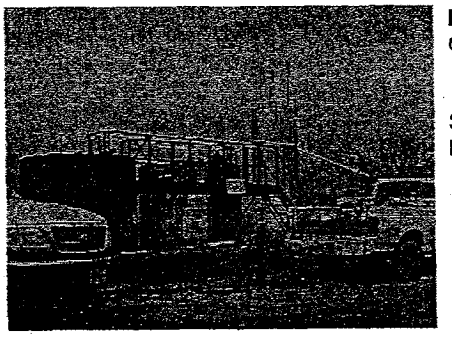
FINDINGS:
Faded paint and rust were observed on the steel storage tanks when initially inspected in March 2005.

SUGGESTIONS/SOLUTIONS:
The tanks were repainted in July 2005.



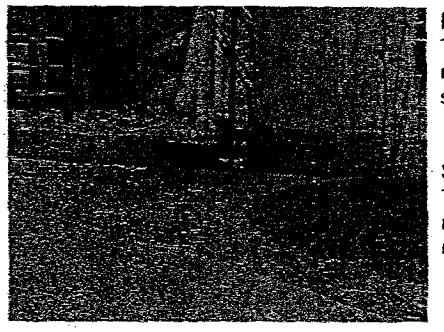
FINDINGS:
Wide-angle shot shows sloping of facility for reference to conditions for SPCC concerns. Also, a lack of fencing around the facility is evident.

SUGGESTIONS/SOLUTIONS:
The addition of a perimeter fence is recommended to improve security.



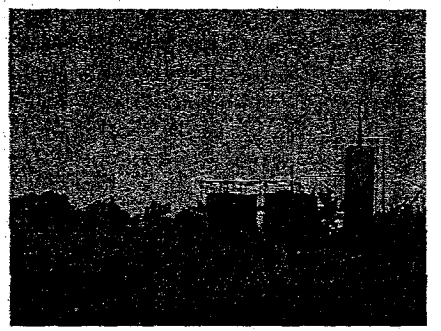
FINDINGS:
Consistent height of diking indicates sufficient secondary containment.

SUGGESTIONS/SOLUTIONS:
N/A



FINDINGS:
The interior of the secondary containment area has no form of liner or material along the ground, for the purpose of preventing spills from seeping into the ground.

SUGGESTIONS/SOLUTIONS:
The addition of a non-absorbent and/or non-liquid-conducting liner or material to the floor of the secondary containment area is recommended.



SITE IMPROVEMNTS:
In July 2005, tanks were repainted.

TEST RESULTS

There was no distressed vegetation or standing free product, outside of the diking area; therefore, no samples were collected and no analyses were performed.

CONCLUSION

Steps to maintain operational capability were performed in July 2005 when the steel storage tanks were repainted; however, minor efforts to achieve environmental compliance are suggested.

With the combination of improvements needed (for SPCC purposes) and in the implementation of improved general housekeeping of the facility, a variety of basic steps are recommended.

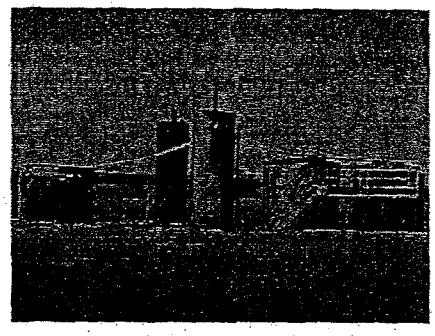
This includes:

- Providing a means or method to improve spilled/released product recovery rates, efficiency, and effectiveness;
- Improving facility security with appropriate fencing; and
- Ensuring the containment is sufficiently impervious to prevent any migration outside of the dike.

LOCATION NW ¼ 15-29-11

GENERAL ASSESSMENT With two (2) 100-barrel oil tanks for Thunderbolt and two (2) 100-barrel oil tanks for North Hickory, and one (1) 100-barrel brine tank for both facilities, the combined facilities require a current and accurate SPCC plan. Present SPCC documents may require updating to meet current regulations and guidelines, and current facility conditions may also require updating and improvement.

DETAILS The following photos and photo-specific comments provide details regarding the facility's needed updates and compliance efforts:

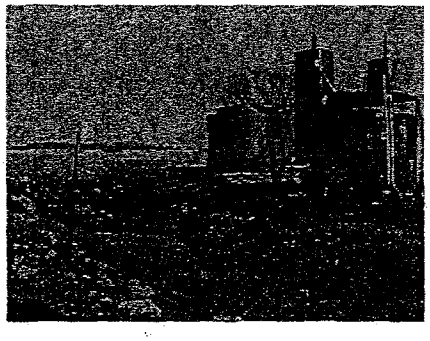


FINDINGS:
Faded paint and rust were observed on the steel storage tanks when initially inspected in March 2005.

SUGGESTIONS/SOLUTIONS:
The tanks were repainted in July 2005.

FINDINGS:
1. Inconsistent height of diking presents minor concern.
2. The interior of the secondary containment area has no form of liner or material along the ground, for the purpose of preventing spills from seeping into the ground.

SUGGESTIONS/SOLUTIONS:
1.If necessary, minor grading may be used to ensure height of diking is level around the perimeter of the tank battery, especially on the down-slope side.
2. The addition of a non-absorbent and/or non-liquid-conducting liner or material to the floor of the secondary containment area is recommended.



FINDINGS:
Standing water within the sump area immediately following a rain event suggests permeability may be sufficiently low to contain spills.

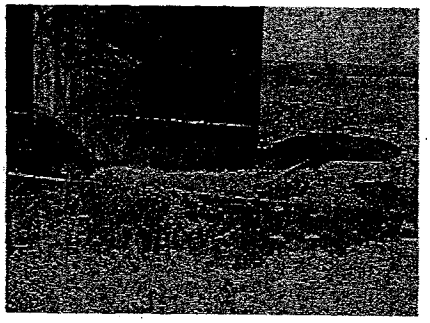
SUGGESTIONS/SOLUTIONS:
Rainwater should be removed from the containment area to provide sufficient containment volume in the event of a petroleum release.

FINDINGS:
Wide-angle shot shows sloping of facility for reference to conditions for SPCC concerns.

SUGGESTIONS/SOLUTIONS:
N/A

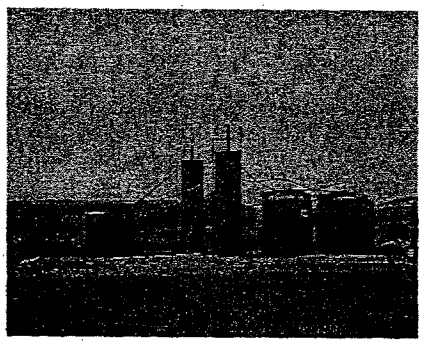
FINDINGS:
The interior of the secondary containment area has no form of liner or material along the ground, for the purpose of preventing spills from seeping into the ground.

SUGGESTIONS/SOLUTIONS:
The addition of a non-absorbent and/or non-liquid-conducting liner or material to the floor of the secondary containment area is recommended.

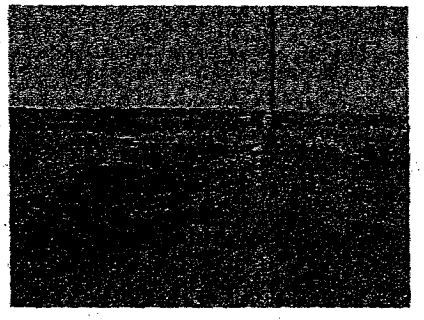


FINDINGS:
Significant staining from historical releases is evident.

SUGGESTIONS/SOLUTIONS:
Identify the source of the release and perform necessary repairs, if required. Steps to reclaim, recycle, and/or remediate this stained soil are also recommended.



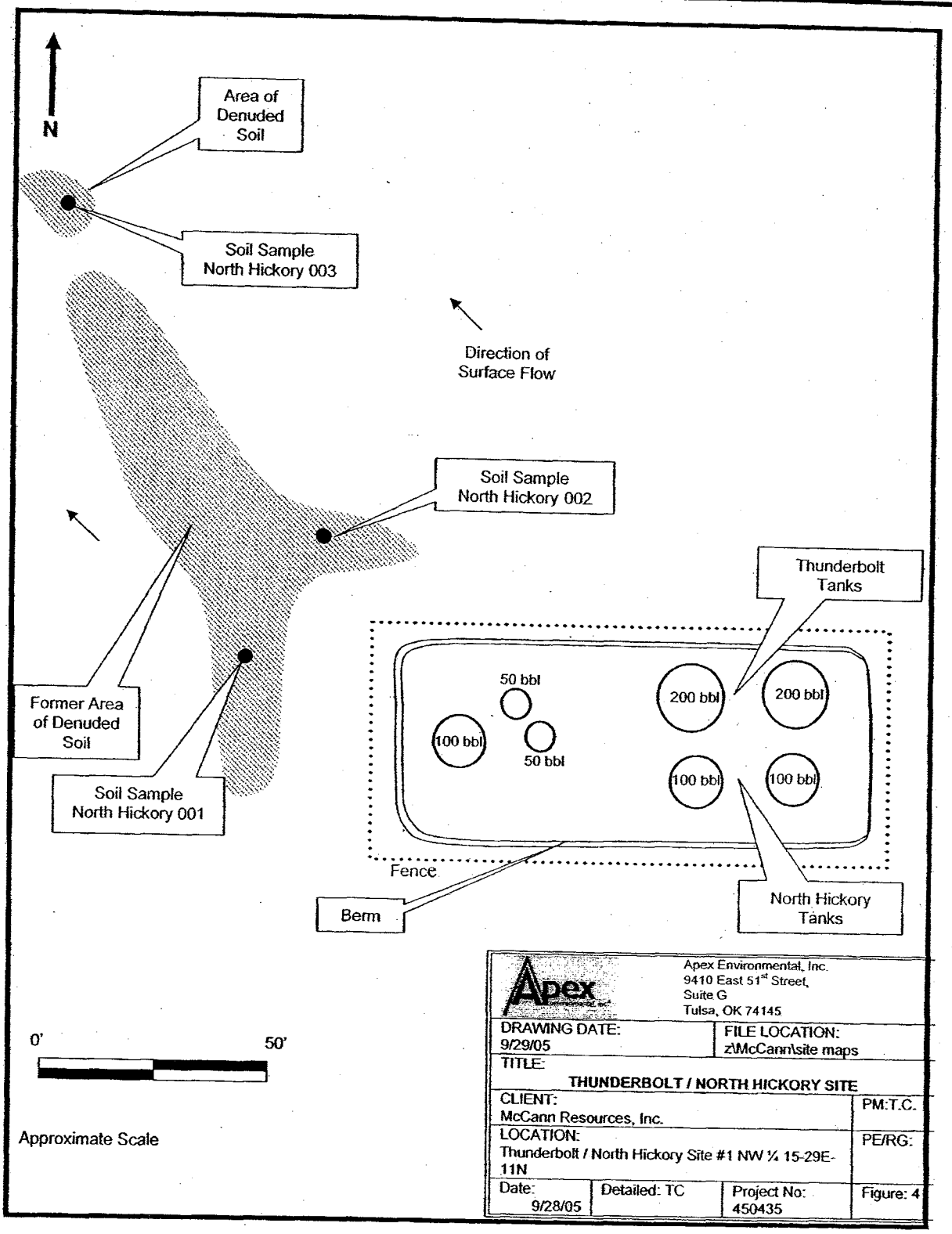
SITE IMPROVEMENTS:
In July 2005, tanks were repainted.



SITE IMPROVEMENTS:
The area of denuded vegetation was remediated in October 2005. The impacted soil was excavated and replaced with new topsoil and reseeded.

TEST RESULTS

Soil samples were not collected at the site during the initial March 2005 site investigation. At the request of EPA Region VI, the site was revisited on September 28, 2005 and surface soil samples were collected from a denuded area northwest (down-slope) of the tank battery site. This area demarks the location of an historical brine release. Three surface soil samples were collected for analysis of salinity management parameters. Each sample consisted of a composite of three individual samples collected within a radius of approximately three feet at each sample location. The attached site sketch (**Figure 4**) illustrates the locations of surface soil samples and other site structures.


N
Area of Denuded Soil
Soil Sample North Hickory 003
Direction of Surface Flow
Soil Sample North Hickory 002
Thunderbolt Tanks
Former Area of Denuded Soil
Soil Sample North Hickory 001
50 bbl
100 bbl
50 bbl
200 bbl
200 bbl
100 bbl
100 bbl
Fence
Berm
North Hickory Tanks
0'
50'
Approximate Scale
Apex Environmental, Inc.
9410 East 51st Street,
Suite G
Tulsa, OK 74145
DRAWING DATE: 9/29/05
FILE LOCATION: z\McCann\site maps
TITLE: THUNDERBOLT / NORTH HICKORY SITE
CLIENT: McCann Resources, Inc.
PM:T.C.
LOCATION: Thunderbolt / North Hickory Site #1 NW ¼ 15-29E-11N
PE/RG:
Date: 9/28/05
Detailed: TC
Project No: 450435
Figure: 4

The analytical results indicate TSS in the samples ranged from 27,027 ppm in sample 003 (collected at the location farthest down gradient from the tank battery), to 82,962 ppm in sample 002 (collected approximately 40 feet northwest of the tank battery site). The concentration of 27,027 ppm TSS is approximately ten times higher than normal and sufficiently high to reduce yields of even salt tolerant crops. The concentration of 82,962 ppm TSS in sample 002 is approximately 31 times higher than normal. A copy of the analytical laboratory report is included in **Attachment B**. A summary of the analytical results is included in the following table:

	Thunderbolt & North Hickory Release		
Cations	Sample 001	Sample 002	Sample 003
Sodium (ppm)	10,803	22,482	6,991
Calcium (ppm)	1,653	3,276	685
Magnesium (ppm)	390	635	192
Potassium (ppm)	88	115	33
Derived Values			
Total Soluble Salts (TSS in ppm)	45,144	82,962	27,027
Sodium Adsorption Ratio (SAR)	62.1	94.2	60.8
Potassium Adsorption Ratio (PAR)	0.3	0.3	0.2
Exchangeable Sodium Percentage (ESP)	47.2	57.7	46.7
Exchangeable Potassium Percentage (EPP)	6.3	6.2	5.1
Other			
pH	4.6	4.5	4.7
EC (µmhos/cm)	68,400	125,700	40,950
Boron	0.27	0.44	0.17

CONCLUSION

Concentrations of salt in surface soils within the former release area were ten to 31 times higher than normal when sampled in September 2005. **The area of denuded vegetation was remediated in October 2005. The impacted soil was excavated and replaced with new topsoil and reseeded.**

Steps to maintain operational capability of the site equipment were performed in July 2005 when the tank battery equipment was repainted.

With the combination of improvements needed (for SPCC purposes) and in the implementation of improved general housekeeping of the facility, a variety of basic steps are recommended.

This includes:

- Providing a means or method to improve spilled/released product recovery rates, efficiency, and effectiveness;
- Removing rainwater from the collection sump;
- Implementing remediation of stained soil (including proper treatment and/or disposal procedures);
- Improving facility security with appropriate fencing;
- Regrading and improving the diking and the materials that they are composed of, as well as increasing potential containment volumes;
- Providing some form of lining (or lining material - like bentonite) for the floor/ground inside the diked areas; and

LOCATION

SE ¼ 04-27N-11E
SE ¼ 33-28N-11E

GENERAL ASSESSMENT

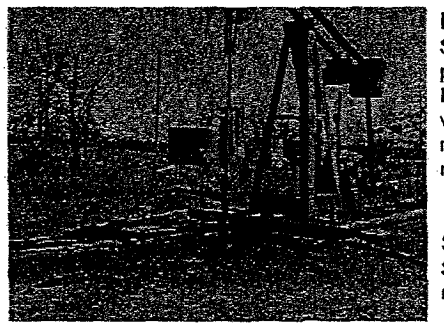
With one (1) 200-barrel brine tank and two (2) 100-barrel oil tanks, the facility requires a current and accurate SPCC plan. Present SPCC documents may require updating to meet current regulations and guidelines, and current facility conditions may also require updating and improvement.

DETAILS

The following photos and photo-specific comments provide details regarding the facility's needed updates and compliance efforts:

FINDINGS:
Wide-angle shot shows sloping of facility for reference to conditions for SPCC concerns. Also, potentially inadequate fencing around the facility is evident.

SUGGESTIONS/SOLUTIONS:
The addition or improvement of the perimeter fencing is recommended to improve security.

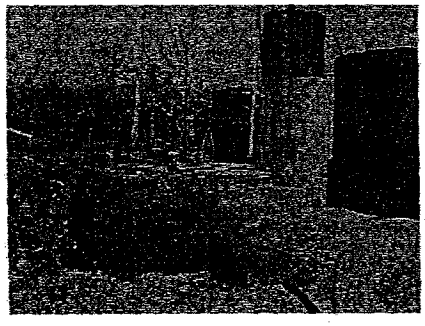


FINDINGS:
Significant staining is evident. Also, there is no form of containment present around this area.
NOTE: While the requirement of secondary containment for a storage vessel does not apply to well heads, if the staining persists, some method of containing the hydrocarbons (to avoid storm water run-off) is recommended.

SUGGESTIONS/SOLUTIONS:
Steps to reclaim, recycle, and/or remediate this stained soil are recommended.

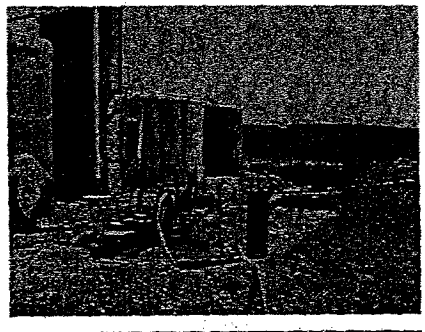
FINDINGS:
1. Inconsistent height of diking presents minor concern.
2. The interior of the secondary containment area has no form of liner or material along the ground, for the purpose of preventing spills from seeping into the ground.

SUGGESTIONS/SOLUTIONS:
1. Updates to grading and the quality of diking (materials/design) would improve both the integrity of the diking and potential containment capability.
2. The addition of a non-absorbent and/or non-liquid-conducting liner or material to the floor of the secondary containment area is recommended.



FINDINGS:
The presence of standing water suggests the permeability of the containment sump is sufficiently low to contain a petroleum release.

SUGGESTIONS/SOLUTIONS:
Rainwater should be removed from the sump area to provide adequate storage volume in the event of a petroleum release.

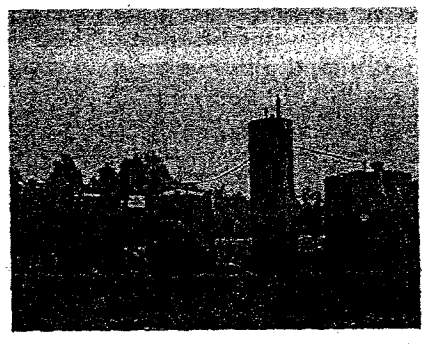


FINDINGS:
Faded paint and rust indications observed on metal storage tanks.

SUGGESTIONS/SOLUTIONS:
Re-painting each vessel would provide both aesthetic and operational improvement to the storage vessels.

FINDINGS:
The sump pit is lined with native clay without supplemental lining materials.

SUGGESTIONS/SOLUTIONS:
The clay lined sump pit appears to exhibit sufficiently low permeability; however, supplemental pit lining material may be required in the future.



SITE IMPROVEMENTS:
In July 2005, the tanks were repainted.

Oil production equipment on the Whitmier lease was inspected on October 13, 2005 to assess any leaks or potential leaks associated with flow lines, connections, wellheads, saltwater pumps, and other equipment. Four non-operational wellheads and one non-operational saltwater injection well were inspected. The tanks and equipment were freshly painted and appeared to be within industry standards in the area. No active leaks or obvious indications of faulty equipment were observed. A summary of the inspection is included in the attached Mechanical Equipment Assessment Summary (**Attachment A**).

TEST RESULTS

No distressed vegetation or standing free product was observed outside of the diking area during the initial March 2005 site visit and no samples were collected. At the request of EPA Region VI, the site was revisited on September 28, 2005 and surface soil samples were collected from a drainage ditch located south (down-slope) of the tank battery site. The EPA reported that the ditch had been impacted by an historical flow line failure. Three surface soil samples were collected for analysis of salinity management parameters. Each sample consisted of a composite of three individual samples collected within a radius of approximately three feet at each sample location. The attached site sketch (**Figure 5**) illustrates the locations of surface soil samples and other site structures.