CASE NO. 14015
OCD EXHIBIT 15

OCD'S 2007

PIT SAMPLING PROGRAM

What is in that pit?

WHAT'S IN THAT PIT?

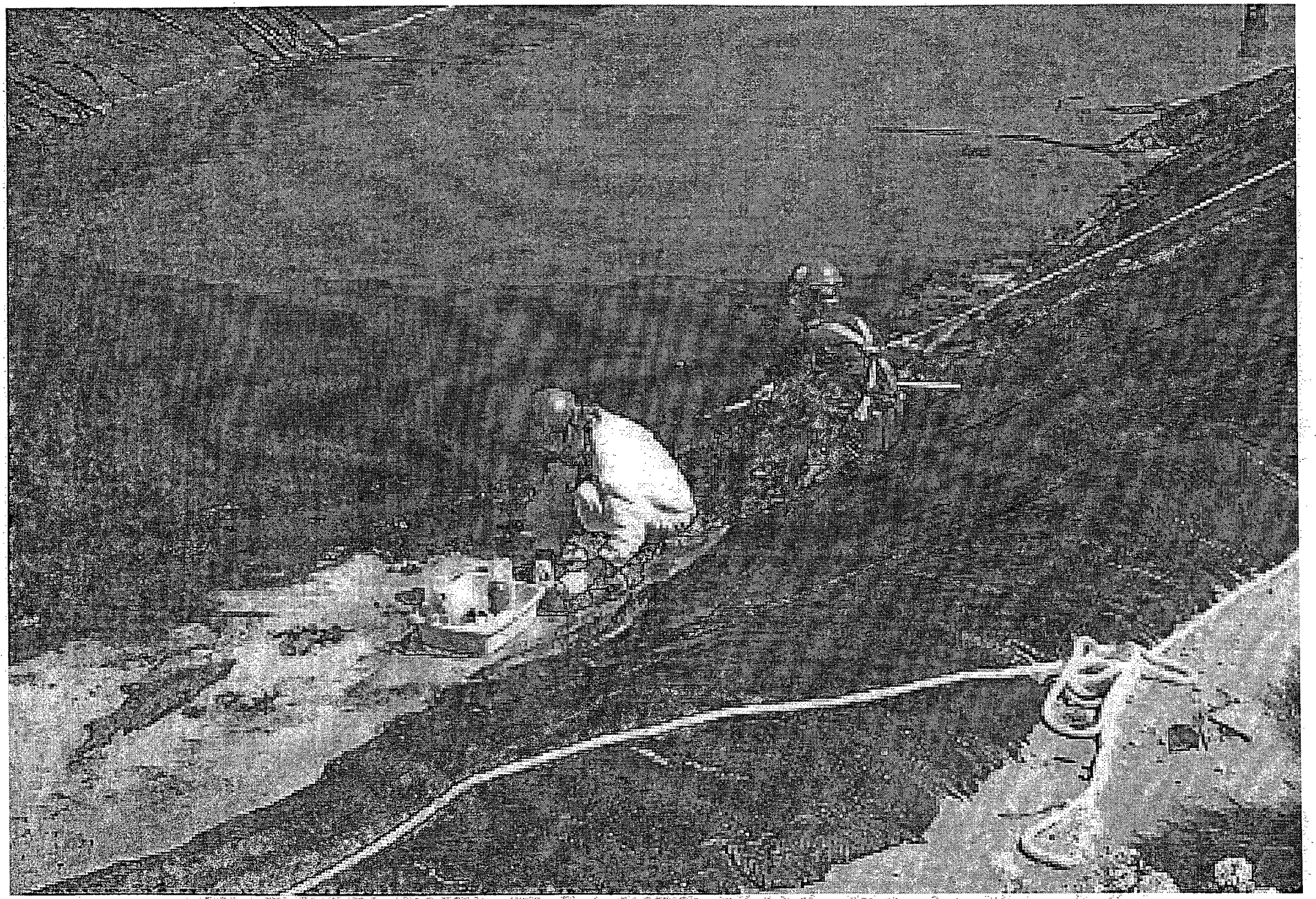
- During the four public outreach sessions that OCD held in December 2006 and January 2007 to gain input on OCD's proposed pit rulemaking, OCD heard many individuals ask for information on the contents of various oil and gas pits. From May 22 to June 1, 2007, OCD staff collected aqueous and non-aqueous samples to *answer the questions raised during the pit rulemaking outreach meetings*.

OCD'S PIT SAMPLING PROGRAM MAY – JUNE 2007

- Following a Sampling and Analysis Plan (SAP) that specified the field sampling protocols, laboratory analyses, and quality assurance/ quality control (QA/QC) procedures, OCD collected 25 aqueous and non-aqueous samples from drilling, workover, reserve pits, or tanks in the Southeast in May 2007 and 12 samples from the Northwest in June 2007.
- A copy of OCD's SAP is included as an Exhibit.

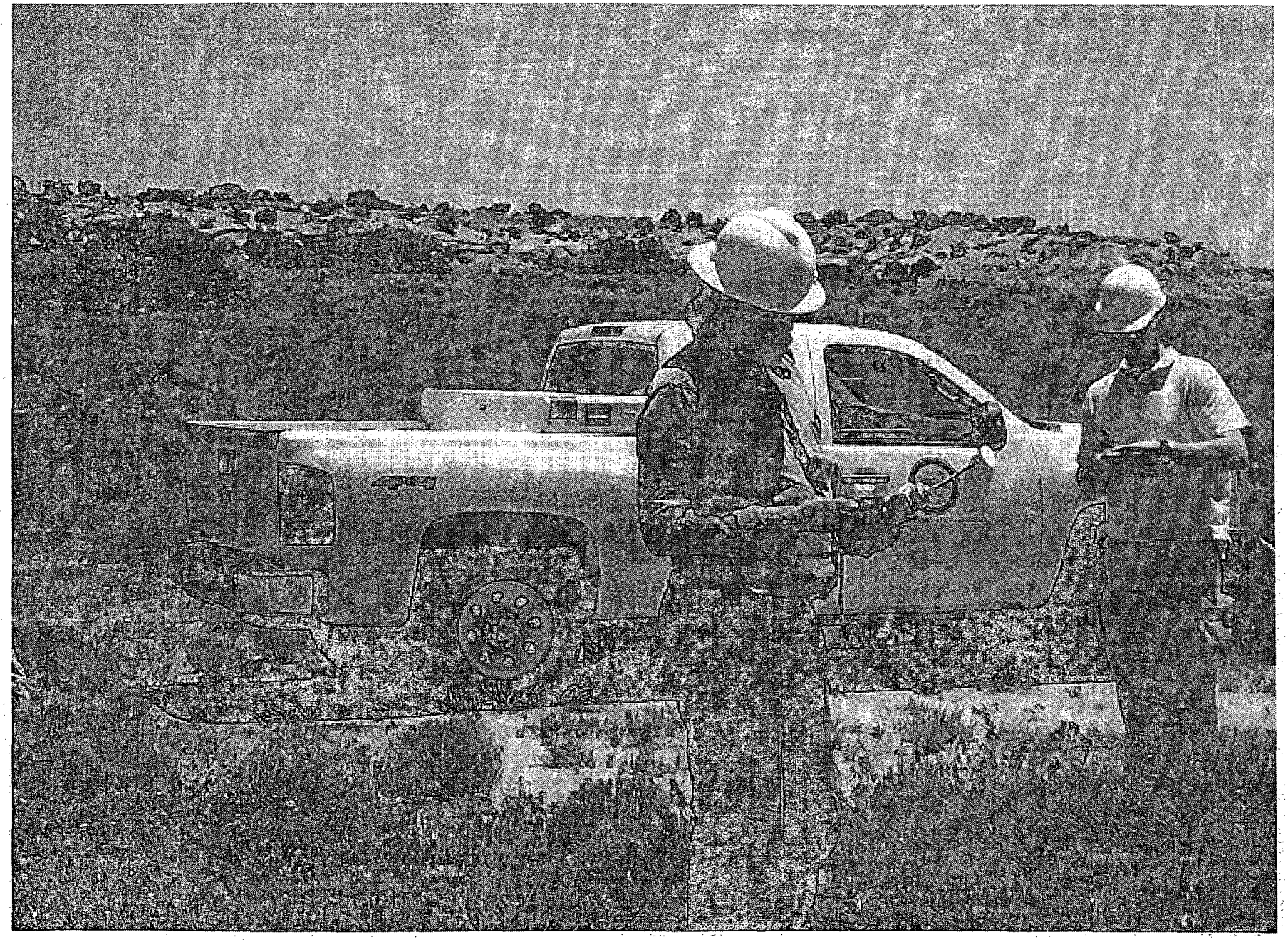
OCD'S PIT SAMPLING PROGRAM MAY – JUNE 2007

- OCD collected samples of pit contents and drilling fluids using pre-cleaned, disposable dippers and scoops in appropriately preserved sample containers (glass jars and bottles and plastic bottles).



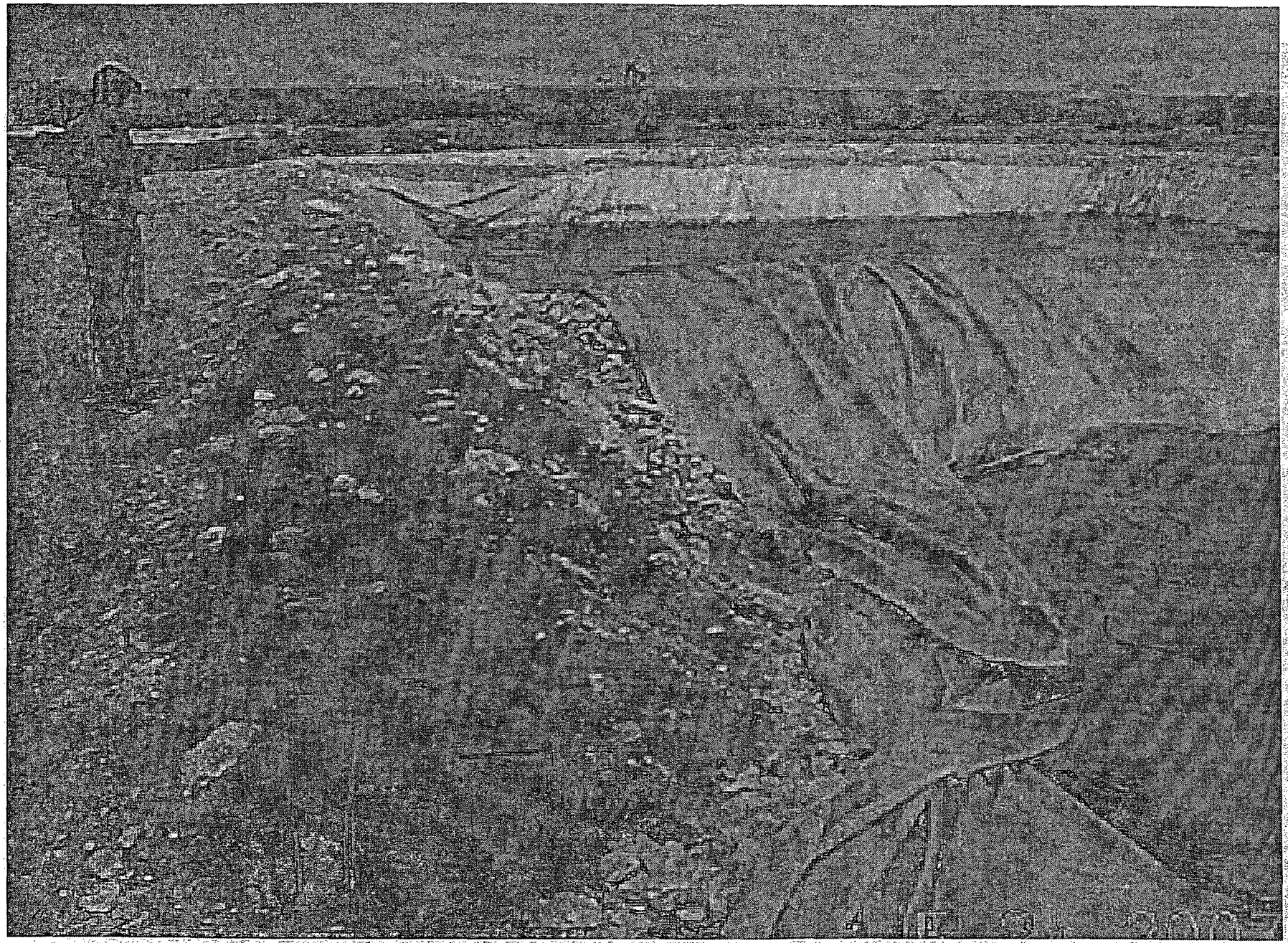
OCD'S PIT SAMPLING PROGRAM
MAY – JUNE 2007

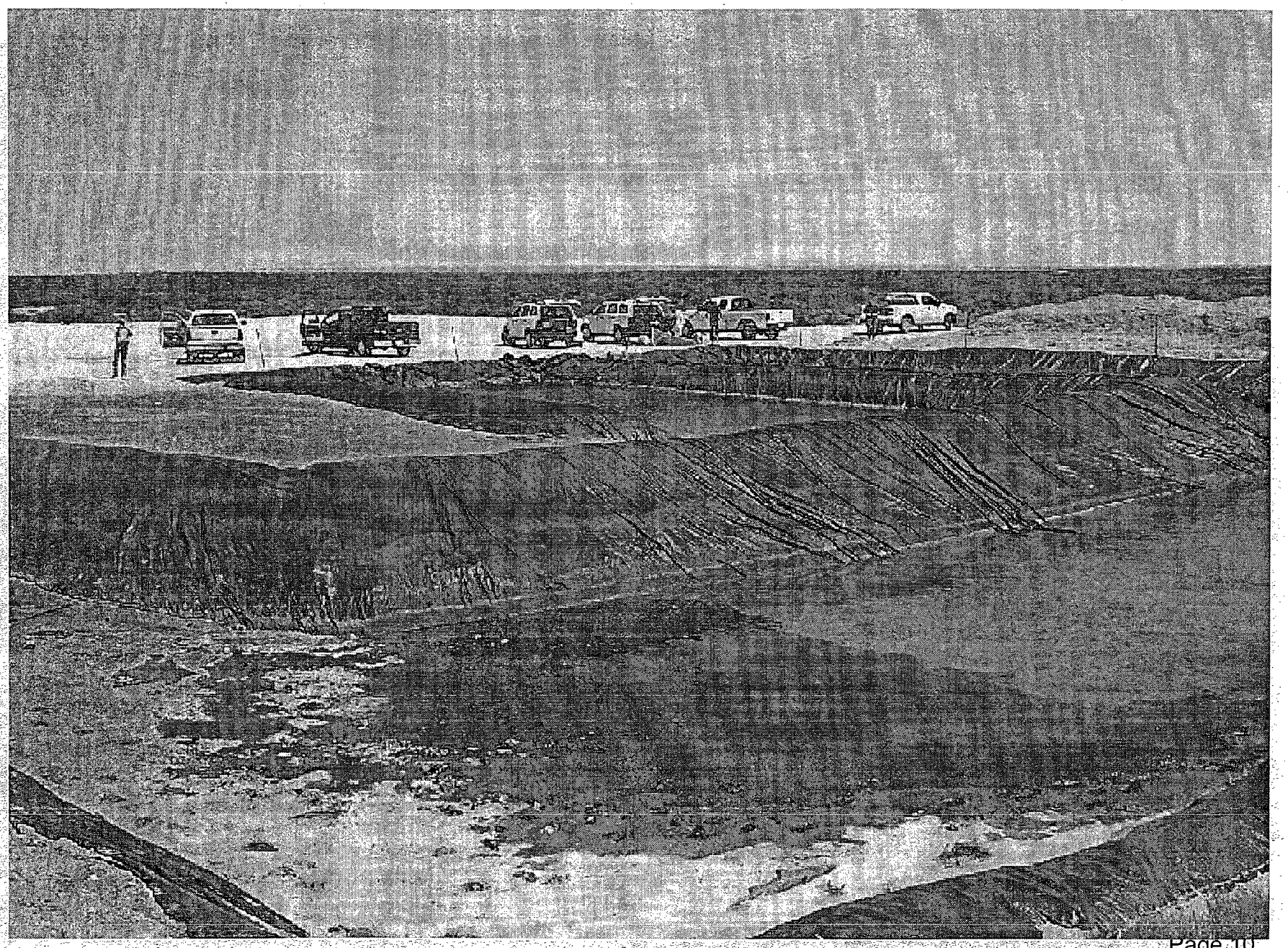
- OCD surveyed the pit locations using GPS, sketched a site plan, inspected the site, and photographed the pits and sites.

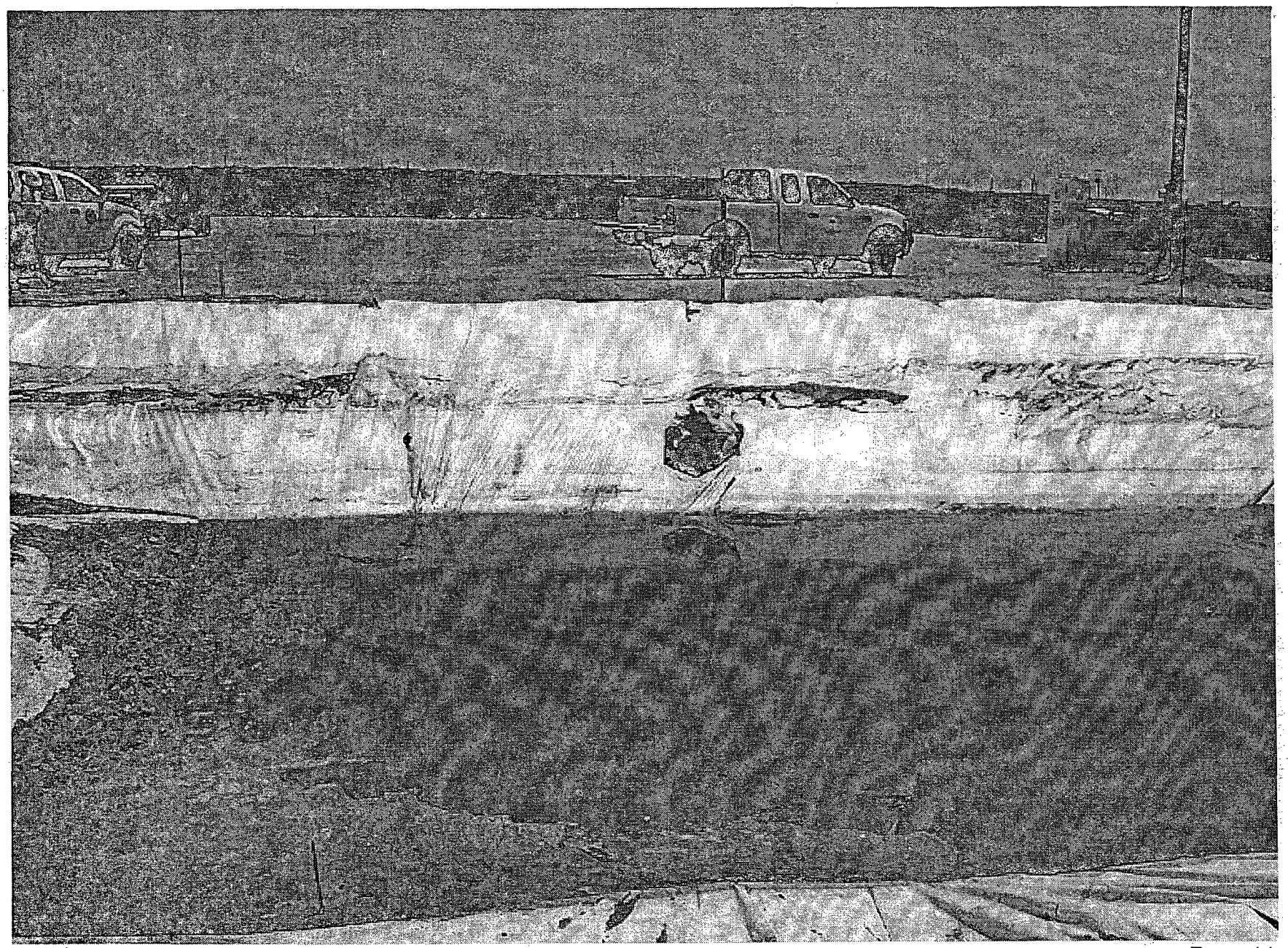


OCD'S PIT SAMPLING PROGRAM
MAY – JUNE 2007

- *COMMON PROBLEMS*
  - Non-anchored and/or breached liners
  - Lack of proper sub-base and berm construction
  - Oil on pits
  - Rips and tears in liner



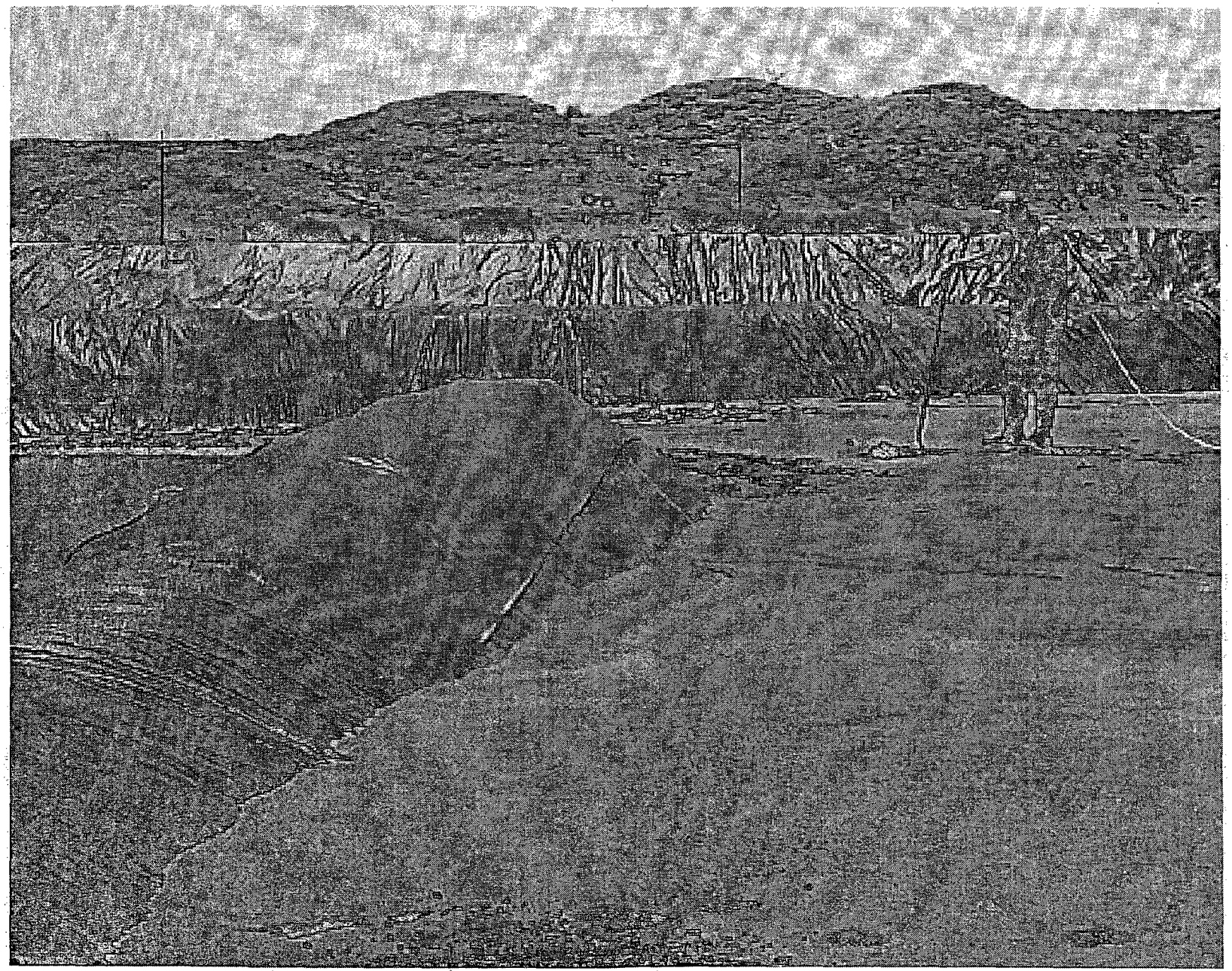


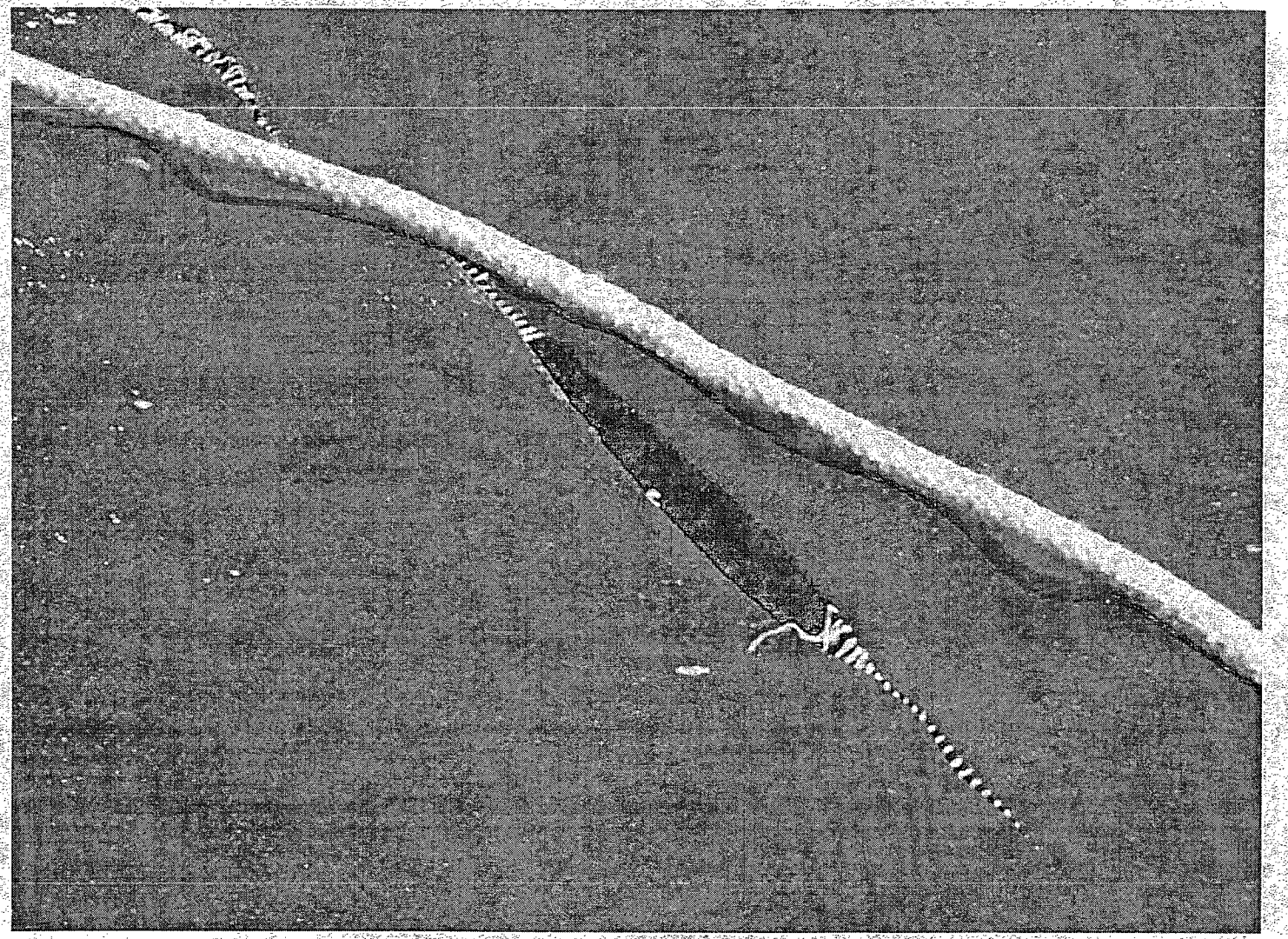


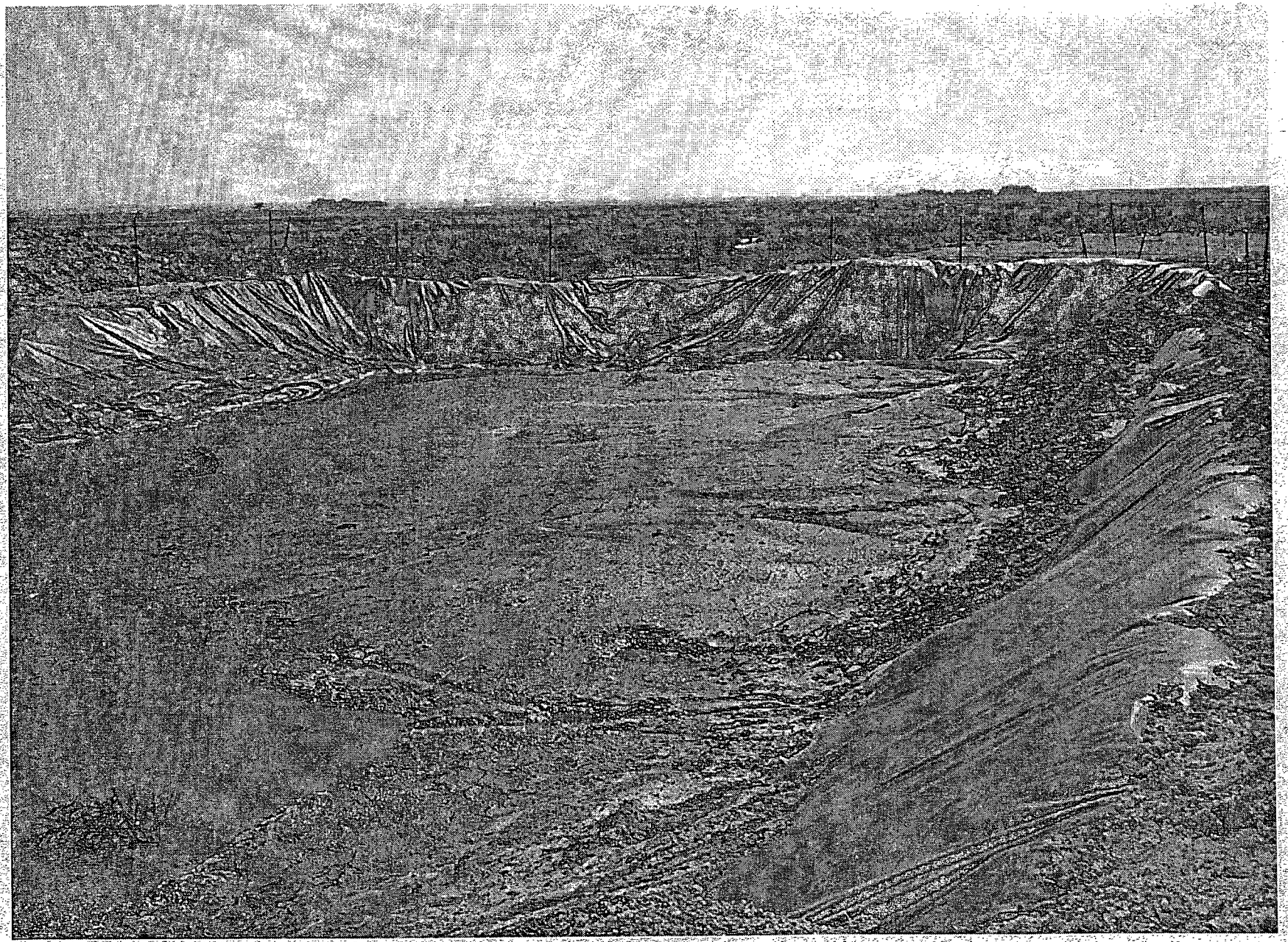
OCD'S PIT SAMPLING PROGRAM
MAY – JUNE 2007

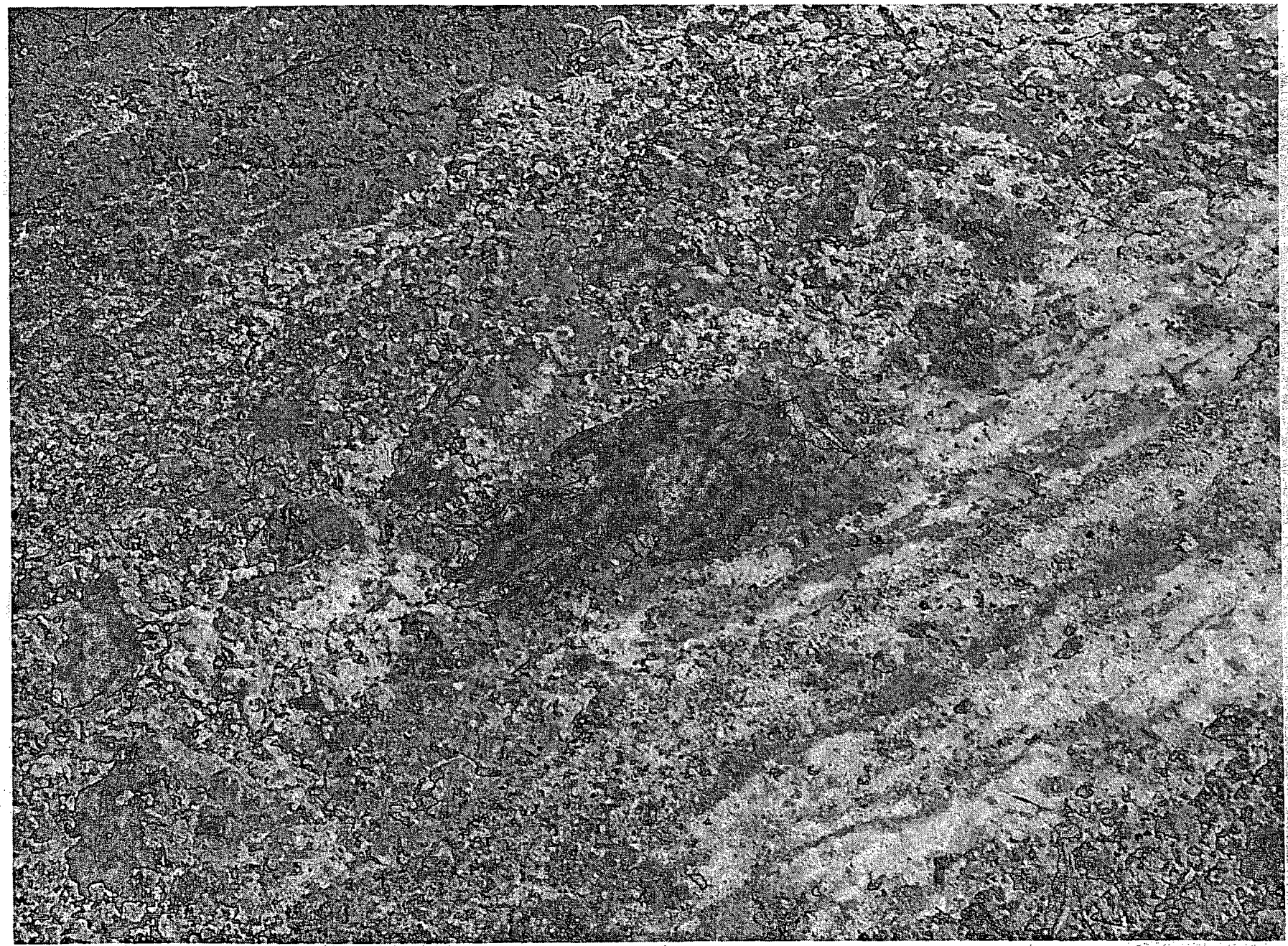
➢ COMMON PROBLEMS

- Liner seam problems (orientation & stitched seams)
- Sediment run-on/off problems into and under liners
- Lack of netting to exclude birds
- Unlined pits









OCD'S PIT SAMPLING PROGRAM
MAY – JUNE 2007

- OCD collected judgmental aqueous and non-aqueous samples which were then analyzed for volatile organic compounds (VOCs), semi-volatile compounds (SVOs), gasoline-range and diesel-range organics (GRO-DRO), polynuclear aromatic hydrocarbons (PAHs), total extractable petroleum hydrocarbons (TPH), total metals, and general chemistry cations and anions (Gen Chem).

OCD'S PIT SAMPLING PROGRAM MAY – JUNE 2007

OCD SAP SECTION 4.0 PROCEDURES FOR JUDGEMENTAL SAMPLE LOCATION AND COLLECTION

- ✓ *Judgmental sampling is the subjective selection of sampling locations at a site, based on historical information, visual inspection, and on best professional judgment of the sampling team. OCD will use judgmental sampling to identify pit sample locations that exhibit visual staining, sheen on water, and/or odor detection by using a PID monitor to screen for VOCs. Consequently, judgmental sampling has no randomization associated with the sampling strategy, precluding any statistical interpretation of the sampling results.*

ANALYTICAL RESULTS OF OCD'S PIT SAMPLING PROGRAM

- OCD used judgmental sampling to collect 25 samples from the Southeast and 12 samples from the Northwest. The samples were analyzed using EPA methods for the following constituents:
  - ✓ 69 VOCs by 8260B
  - ✓ 93 SVOs by 8270C
  - ✓ GRO & DRO by 8015M
  - ✓ 17 PAHs by 8270C
  - ✓ TPH by 418.1
  - ✓ 7 RCRA Metals by 6010B/6020 and 7470A/7471A
  - ✓ 14 "Gen Chem" analytes by EPA methods specified in 40 CFR 136.3

ANALYTICAL RESULTS OF OCD'S PIT SAMPLING PROGRAM

- OCD placed summaries of all analytical results along with photos of pits on its webpage and provided copies to the Pit Rule Task Force members in July 2007.

ANALYTICAL RESULTS OF OCD'S PIT SAMPLING PROGRAM

- OCD generated 25 separate analytical reports for the webpage.
- Each report includes photos depicting the general pit conditions encountered in the field and a summary of the analytical results.
- A compendium of OCD's reports is included as an Exhibit.

ANALYTICAL RESULTS OF OCD'S PIT SAMPLING PROGRAM

- OCD imported the separate analytical reports into Excel spreadsheets to better summarize the data.
- The data are subdivided by matrix (soil/sludge vs. water/fluids) and geography (Northwest vs. Southeast New Mexico).

OCD Pit Sampling Data

- von CROSSTAB.xls

ANALYTICAL RESULTS OF OCD'S PIT SAMPLING PROGRAM

➢ NW SOIL DETECTS

- ✓ 11 / 17 PAHs by 8270
- ✓ 12 / 93 SVOs by 8270
- ✓ 14 / 69 VOCs by 8260
- ✓ 19 / 23 GEN CHEM, INORGANICS, ETC.

➢ SE SOIL DETECTS

- ✓ 4 / 17 PAHs by 8270
- ✓ 7 / 93 SVOs by 8270
- ✓ 14 / 69 VOCs by 8260
- ✓ 21 / 23 GEN CHEM, INORGANICS, ETC.

ANALYTICAL RESULTS OF OCD'S PIT SAMPLING PROGRAM

➢ NW WATER DETECTS

- ✓ 11 / 17 PAHs by 8270
- ✓ 9 / 93 SVOs by 8270
- ✓ 15 / 69 VOCs by 8260
- ✓ 20 / 24 GEN CHEM, INORGANICS, ETC.

➢ SE WATER DETECTS

- ✓ 9 / 17 PAHs by 8270
- ✓ 10 / 93 SVOs by 8270
- ✓ 13 / 69 VOCs by 8260
- ✓ 22 / 24 GEN CHEM, INORGANICS, ETC.

ANALYTICAL RESULTS OF OCD'S PIT SAMPLING PROGRAM

- Note: OCD's Summary Excel Tables use the maximum value to characterize the constituents present in the pits.

- Note: Some results have been recalculated to µg/kg (soil/sludge) and µg/l (water/liquids).

ANALYTICAL RESULTS OF OCD'S PIT SAMPLING PROGRAM

- The tables include the WQCC Standards for Ground Water, TCLP, and NMED's 2006 Soil Screening Levels (SSLs), and some of the Industry Committee's data for comparison with OCD's results.

ANALYTICAL RESULTS OF OCD'S PIT SAMPLING PROGRAM

- Approximately 77 constituents were detected in at least one sludge/soil sample or a liquid/water sample.

SUMMARY - OCD'S PIT SAMPLING PROGRAM

- Five OCD samples failed the Toxicity Characteristic Leaching Procedure (TCLP) test. Except for the statutory RCRA exemption, these pits would have been determined to contain characteristically hazardous waste.

SUMMARY - OCD'S PIT SAMPLING PROGRAM

- The TCLP test is used by EPA to determine whether a waste is *characteristically hazardous*.
- The Industry Committee used the TCLP test to determine "*environmental mobility and bioavailability*."

SUMMARY - OCD'S PIT SAMPLING PROGRAM

- **NOTE:** The use of the TCLP test is ***not recommended*** by EPA Superfund in its *Risk Assessment Guidance for Superfund* (RAGS). Industry's use of the TCLP test in its sampling program was not useful in determining what constituents are actually present in the pit contents.

SUMMARY - OCD'S PIT SAMPLING PROGRAM

- Based on OCD's data, 5 constituents that would have exceeded the **TCLP** test for liquids (no dilution):
  - Arsenic
  - Lead
  - Mercury
  - 2,4-Dinitrotoluene
  - 2-Methylnaphthalene

SUMMARY - OCD'S PIT SAMPLING PROGRAM

- Based on OCD's data, Lead would have exceeded the **TCLP** test for **solids** (20 times dilution of totals) and would be considered characteristically hazardous, except for the RCRA Exemption.

SUMMARY - OCD'S PIT SAMPLING PROGRAM

- Although pit fluids are not ground water, 17 constituents were present in the OCD pit fluid samples at concentrations that exceed the *WQCC Ground Water 3103 Standards*. These constituents include:

SUMMARY - OCD'S PIT SAMPLING PROGRAM

- Naphthalene
- Benzo(a)pyrene
- Phenol
- Benzene
- Toluene
- m,p-Xylene
- Chloride
- Fluoride
- Sulfate
- pH
- Total Dissolved Solids
- Total Arsenic
- Total Barium
- Total Cadmium
- Total Chromium
- Total Mercury
- Total Lead

SUMMARY - OCD'S PIT SAMPLING PROGRAM

Conclusion

- Despite industry's attempts to characterize pit contents as *"benign"* and avoid references to "*waste"* during the Task Force meetings, OCD's analytical data clearly demonstrate that drilling, workover, and production pits contain several dozens of constituents.

SUMMARY - OCD'S PIT SAMPLING PROGRAM

- All constituents are *toxic* to some degree (First Law of Toxicology – *"The dose makes the poison"* - Paracelsus).
- Except for the RCRA Exemption, some constituents were present at concentrations that would be characteristically hazardous at other sites.

SUMMARY - OCD'S PIT SAMPLING PROGRAM

- Drilling, workover, and production pits all handle large volumes of liquids and solids.
- The liquids and solids are oil field waste and must be handled appropriately so that human health and the environment are protected.
- Sensible and appropriate waste management is required.

SUMMARY - OCD'S PIT SAMPLING PROGRAM

- OCD sampled for a relatively large suite of constituents, but did not attempt to conduct a science project because it is not relevant to proper oil field waste management.

SUMMARY - OCD'S PIT SAMPLING PROGRAM

- Neither the number of constituents, nor the concentration of the constituents, changes the RCRA exemption – oil field wastes are exempt from RCRA Hazardous Waste Management regulations. However, oil field waste must still be managed appropriately.

SUMMARY - OCD'S PIT SAMPLING PROGRAM

- Part 17 specifies both the **general** and **technical standards** that will ensure that oil field waste that is *generated* in pits and below-grade tanks is *managed* and *disposed of* properly.

INDUSTRY COMMITTEE PIT SAMPLING PROGRAM

- The Industry Committee sampled six New Mexico sites for soils/sludges only and submitted a "*Data Summary Report*" to the Pit Rule Task Force.
- Industry Committee Report provided average and concentration range data, but did not provide actual laboratory summary reports.
- No SAP was provided.

INDUSTRY COMMITTEE PIT SAMPLING PROGRAM

- No photos documenting the condition of the pits was provided.
- VOCs were collected ***after*** the samples were composited in the field (biased low).
- Laboratory reports with QA/QC were not provided.
- Industry used EPA methods similar to those used by OCD except for "soluble" fraction.

OCD'S PIT SAMPLING PROGRAM

- Industry Task Force representatives accompanied OCD on its sampling program.
- Industry Task Force "split" soil/sludge samples with OCD.

EPA's 1987 REPORT TO CONGRESS

Management of Wastes from the Exploration, Development, and Production of Crude Oil, Natural Gas, and Geothermal Energy.

EPA's 1987 REPORT TO CONGRESS

- Focusing on produced water and drilling muds, EPA sampled a total of 42 sludge samples and 59 liquid samples at 19 drill sites, 23 production sites, 4 centralized pits, and 3 centralized treatment facilities for the following constituents:

EPA's 1987 REPORT TO CONGRESS

Table 7. Summary of Analytes

	Number of Analytes	
Organics		
Volatiles by GCMS		
Isotope dilution	32	
Reverse search	23	
Semi-volatiles by GCMS		
Isotope dilution	82	
Reverse search	94	
Dioxins and furans by GCMS	136	
Pesticides by GC		
Electron capture detector (ECD)	39	
Flame photometric detector (FPD)	35	
Herbicides by GC/ECD	3	
Total organics		444
Metals		
Atomic absorption	6	
Calibrated Inductively Coupled Plasma (ICP)	21	
ICP screening	41	
Total metals		68
Conventionals by wet chemistry		19
RCRA (Corrosivity, Ignitability, Reactivity)		3
Total number of analytes		534

EPA's 1987 REPORT TO CONGRESS

- EPA (1987) detected 134 constituents in its characterization program.

Other Studies of Crude Oil, Produced Water, and Hydrocarbon Constituents, Excluding Oil Field Services Waste

- EPA 2000. *Associated Waste Report* - ***72*** *positively detected constituents in completion and workover wastes*
- EPA 2000. *Sector Notebook Project - Oil and Gas Extraction Industry. Table 5: Produced Water Effluent Concentrations* (**47** constituents)

WHAT'S IN THAT PIT?
FINAL SUMMARY

- Temporary and permanent pits, below-grade tanks, and sumps are used to manage large volumes of fluids and solids.

- The fluids and solids contain several dozens, if not hundreds, or even thousands of compounds and isomers.

- EPA has determined that these the fluids and solids do not need to be handled as hazardous waste.

WHAT'S IN THAT PIT?
FINAL SUMMARY

- The fluids and solids managed in pits during the active life of the pit are "product" when being used for the intended purposes and are not "wastes."

WHAT'S IN THAT PIT?
FINAL SUMMARY

- During the active life of the pit, fluids may be released into the environment as a results of leaks and spills. The same fluid that was a "product" is classified as a "waste" when it is released into the environment and must be handled appropriately.

WHAT'S IN THAT PIT?
FINAL SUMMARY

- After the active life of the pit, all fluids and solids become "waste" and must be handled appropriately at closure.
- However, when recycled of reused, pit contents are not "waste."

WHAT'S IN THAT PIT? FINAL SUMMARY

- Part 17 specifies both the *performance* and *enforceable technical standards* that are necessary to ensure that the oil and gas industry manages and disposes of oil field wastes appropriately.