OCD Exhibit 9: Preliminary Environmental Assessment of Cano Petro Operations in Cato Field, Chavez County
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Cano Petro of New Mexico, Inc. (Cano Petro) operates 323 oil production, produced water disposal, and injection wells associated with enhanced oil recovery, and associated operational infrastructure in Chavez and Roosevelt Counties (all or portions of 42 sections across 6 townships). Production in the area dates back more than 50 years across surface and mineral estates held by the State Land Office, Bureau of Land Management, and private concerns. The OCD Environmental Bureau was asked to assess adverse environmental situations. This was done first by an office study followed by a limited field inspection.

Office Study

A check of OCD's database provides a total of 10 reported releases, 3 of which occurred at the same location:

1R-1396 Cato San Andres Unit #18 (API #30-005-20173) Unit Letter O- Section 10- Township 8 South- Range 30 East in Chavez County on Federal surface. Release discovered on 5/24/07 as a flowline leak of >25 bbls of oil and produced water with none recovered. The release was simply covered with sand to prevent livestock from drinking. Affected footprint 150 x150 plus 4 x 300 plus 3 x 80 (total 23,940 sq. ft.). No information on file regarding delineation or cleanup.

1R-1855 Cato San Andres Unit #560 (API #30-005-28012) O-11-8S-30E in Chavez County on private surface. Discovered on 4/3/08 regarding 5 to 10 bbls of oil released with no recovery. Stained vegetation in area 450 by 200' (90,000 sq. ft). Applied Microblaze. Closed by Larry Johnson, formerly with OCD.

1R-1980 Cato #6 Tank Battery L-11-8S-30E (API #30-005-10455 for "well 49") in Chavez County on Private/Fed surface. Release discovered on 10/11/08 of 250 bbls of oil and produced water, 130 bbls recovered for net loss of 120 bbls. Tanks overflowed filling berm which then broke. Affected footprint 400 x 5 plus 600 x 5 plus 350 x 5 plus 1050 x 2 (total 8,850 sq. ft). Applied Microblaze which would only affect the oil component. No delineation or cleanup.

1R-2062 Cato San Andres Unit #507 (API #30-025-10536) O-2-8S-30E in Chavez County with indeterminate surface ownership. Excavated 800 yds of drill pit contents on or about 12/19/08. Four soil samples taken, probably from sides, and analyzed for chlorides only. Numbers look good, but no apparent sample from bottom of excavation. Larry Johnson of OCD may have approved closure but did not update RBDMS database as to status.

1R-2063 Cato San Andres Unit #558 (API #30-005-28010) M-11-8S-30E in Chavez County on indeterminate surface. Removed 220 yds from drilling pit on or about 1/20/09. Sidewall samples look good, but no bottom sample. Closed by Larry Johnson of OCD.

1R-2184 Cato San Andres Unit #544 M-11-8S-30E (latitude 32 28.326', longitude 103 9.077') in Chavez County on indeterminate surface. Release of produced water from drilling pit on or about 1/20/09. Excavated 160 cubic yards. Sidewall samples look good, but no bottom sample. Larry Johnson of OCD may have approved closure but did not update RBDMS.

1R-2518 Cato #6 Tank Battery L-11-8S-30E (same location as tank battery above) in Chavez County on Private/Federal surface. Release discovered on 11/11/09 of 200 bbls of oil and produced water, 40 bbls recovered for net loss of 160 bbls. Note that DTW @ 40 ft. Description of spill the same as 1R-1980. No delineation or cleanup.

1R-2579 Cato San Andres Unit #561 (API #30-005-28029) P-11-8S-30E (latitude 33 37' 38.7", longitude 103 50' 45.0") in Chavez County on Federal surface. On 6/7/10 contractor was onsite to excavate drill pit for burial of contents in trench

and found chloride contamination at bottom. Wanted to excavate to 10 ft, place liner, and backfill. No indication this work was ever done.

1R-4363 Cato #6 Tank Battery L-11-8S-30E in Chavez County on Private/Federal surface. Release of 300 bbls of produced water on 6/11/11 from overflowing tanks. Affected area 4,482 ft by 440 ft (nearly 2 million square feet from latitude 33.63242, longitude 103.85914 to latitude 33.63855, longitude 103.86313). BLM approved soil washing atop lined containment. No indication that the work was ever done.

1R-4779 CSAU Injection Line well #19 I-10-8S-30E (latitude 33.632686, longitude 103.859508) in Chavez County on private surface. On roadway between API #30-005-10484 and #30-005 27974. Release of unknown volume of produced water discovered on 7/20/17 with <2 bbl recovered. Estimate by Cano of impacted area 150' x 1'. BLM estimate 200x90 plus 200x30 plus 170x15 (26,550 sq. ft).

Unresolved releases are potentially in violation of either 19.15.29 NMAC and 19.15.30 NMAC.

21 tank battery locations were identified using Google Earth imagery with a total of 66 individual storage tanks and 13 heater treaters.

Eight open pits were identified using Google Earth imagery. Four were inspected on July 9, 2018. Unclosed temporary pits are a violation of 19.15.17 NMAC.

Two soil piles were identified using Google Earth imagery and were inspected on July 9, 2018. An unpermitted surface waste management facility is in violation of 19.15.36 NMAC.

Two lay down yards were identified using Google Earth imagery.

A private residence exists within the northern portion of the field identified using Google Earth imagery.

A group of 35 groundwater monitoring wells established by the USGS and 16 water supply wells identified by the OSE exist within 15 miles of the Cato field. Depth to water in these wells ranges from 32 to 280 feet beneath surface.

Field Visit

On July 9th, 2018 a limited inspection of the Cano Petro operations in the Cato field was undertaken. Involved in this effort were:

Bob Hoskinson of the BLM Roswell field office
Maxey Brown, OCD District 1 Supervisor
Daniel Sanchez, OCD Compliance Manager
Brad Billings, OCD Hydrologist
Jim Griswold, OCD Environmental Bureau Chief
and Beth Wojahn, EMNRD Communications Director

Cato San Andres Unit Battery #6. This is a group of 13 tanks and 4 heater treaters located in Unit Letter L of Section 11 in Township 8 South, Range 30 East. Based on available images from Google Earth, the battery was constructed sometime after August of 2005 and before August of 2009 with numerous surface flowlines in the immediate area. An aerial image of the battery from Google Earth with a date of 10/4/14 is provided at the top of the following page.

The approximate dimensions of the battery are 500 feet East/West and 200 feet North/South. Each of the tanks has an approximate capacity of 500 barrels (21,000 gallons) and each appears to have been historically overfilled as indicated by sidewall staining emanating from the widow's hatch at the top of each tank and down each tank's side. See photographs below:

Despite the presence of a synthetic liner beneath portions of the tank battery, the apparent history and inattention to best management practices leads the Environmental Bureau to the following recommendations:

1. All liquids from the tanks should be drained and disposed.
2. The tanks, piping, and other infrastructure should be removed or relocated.
3. The liner(s) should be removed and properly disposed.
4. The vadose zone beneath the battery should be investigated for adsorbed contamination by crude oil and produced water.
5. If the soils beneath the battery are contaminated, they should be excavated and backfilled with clean soils.
6. If soil contamination has impacted groundwater, a hydrogeologic investigation of the extents of that contamination must be undertaken such that an appropriate abatement program can be developed.
7. Implementation of groundwater abatement, if necessary.

The other 20 aboveground storage tank locations were not inspected and as such, no recommendations can be made at this time.

Unclosed Pits. As mentioned previously, a group of 8 open pits were identified using Google Earth. Four of those pits were inspected. Photographs are provided below:

To be compliant with OCD's "pit rule" (19.15.17 NMAC), these pits must be closed using the following procedure:

1. Contents of the pit must be removed and properly disposed.
2. The pit liner must be removed and properly disposed.
3. The soils beneath the pit must be sampled and analyzed for concentrations of adsorbed chloride, total petroleum hydrocarbons, benzene, toluene, ethylbenzene, and total xylenes.
4. If the soils are found to be contaminated in excess of the pertinent standards, the extents of the soil contamination must be determined and those soils found to be environmentally problematic should be excavated. Even if the soils are not adversely impacted, the pit area must be properly backfilled and the surface restored and revegetated.
5. If soil contamination has impacted groundwater, a hydrogeologic investigation of the extents of that contamination must be undertaken such that an appropriate abatement program can be developed.

Contaminated Soil Piles. Both soil piles were inspected. They are within close proximity to each other and appear to contain hydrocarbon-impacted materials atop synthetic liners. Photographs are provided below:

These are not properly permitted or constructed surface waste management facilities and should be dealt with as follows:

1. The contaminated soils must be removed for proper disposal.
2. The liners must be removed and properly disposed.
3. The vadose zone beneath the liners should be investigated for adsorbed contamination by crude oil and produced water.
4. If the soils are contaminated, they should be excavated and backfilled with clean soils.
5. If soil contamination has impacted groundwater, a hydrogeologic investigation of the extents of that contamination must be undertaken such that an appropriate abatement program can be developed.

Cost Estimates

Cato San Andres Unit Battery #6

1. All liquids from the tanks should be drained and disposed.

8 tanks x 500 bbls/tank = 4,000 bbls
4,000 barrels x $2.50 disposal cost/bbl = $10,000

2. The tanks, piping, and other infrastructure should be removed, or the infrastructure should be relocated.

Allowance of for demolition and salvage $50,000

3. The liner(s) should be removed and properly disposed.

500 ft x 200 ft x 0.5 (estimated liner coverage) = 50,000 ft^2 of liner
Bundled to an approximate layer thickness of 0.0417 ft (1/2 inch) x 50,000 ft^2 = 2,083 ft^3 = 77 yds^3
77 yds^3 x $50 disposal cost/$yd^3$ = $3,850

4. The vadose zone beneath the battery should be investigated for adsorbed contamination by crude oil and produced water.

500 ft x 200 ft / 1 sample for every 1,600 ft^2 (40 ft centers) = 63 samples
63 samples x $175 per sample analytical cost (chloride by SM 4500, TPH by EPA Method 8015 [extended range], and BTEX by EPA Method 8021) = $11,025 in laboratory costs

Professional labor to undertake sampling, collate data, and reporting 40 hours x $85/hour + $300 expenses = $3,700

Minimum task cost = $11,025 + $3,700 = $14,725

5. If the soils beneath the battery are contaminated, they should be excavated and backfilled with clean soils.

500 ft x 200 ft x 0.5 (assumed contaminated footprint) x 4 ft excavation depth x 1.2 bulking factor= 240,000 ft^3 of contaminated soil = 8,889 yds^3.
8,889 yds^3 x excavation, disposal, and backfilling cost of $100/yd = $888,900

6. If soil contamination has impacted groundwater, a hydrogeologic investigation of the extents of that contamination must be undertaken such that an appropriate abatement program can be developed.

Preliminary groundwater investigation: Should include a minimum of 6 groundwater monitoring wells, each installed to an estimated depth of 85 feet. Surveying of well tops and incorporation into an accurate site map. Development, gauging, and sampling of each well. Laboratory analysis for chloride (EPA Method 300), sulfate (EPA Method 300), total dissolved solids (EPA Method 160.1), and petroleum hydrocarbons (EPA Method 8260 full list). Data reduction and analysis. Allowance of $60,000 ($10,000 per well with installation, sampling, and reporting).

Preparation of groundwater abatement plan: Allowance of $30,000.

Estimated task cost of $60,000 + $30,000 = $90,000

7. Implementation of groundwater abatement, if necessary

Duration and cost are indeterminate.

Pit Closures

1. Contents of each pit must be removed and properly disposed (assuming each pit is devoid of rainwater).

90 ft x 70 ft x 1.5 ft = 9,450 ft^3 = 350 yds^3/pit
350 yds^3/pit x \$50/yd^3 for disposal = \$17,500
\$17,500/pit x 8 pits = <u>\$140,000</u>

2. The pit liners must be removed and properly disposed.

90 ft x 70 ft = 6,300 ft^2 of liner/pit
Bundled to an approximate layer thickness of 0.0417 ft (1/2 inch) x 6,300 ft^2 = 263 ft^3 = 10 yds^3/pit
10 yds^3/pit x \$50 disposal cost/yd^3 = \$500/pit
\$500/pit x 8 pits = <u>\$4,000</u>

3. The soils beneath each pit must be sampled and analyzed for concentrations of adsorbed chloride, total petroleum hydrocarbons, benzene, toluene, ethylbenzene, and total xylenes.

2 samples for each pit x \$175 per sample analytical cost (chloride by SM 4500, TPH by Method 8015, and BTEX by Method 8021) = \$350 in laboratory costs/pit
\$350/pit x 8 pits = \$2,800 in total laboratory costs

Professional labor to undertake sampling, collate data, and reporting 24 hours x \$85/hour + \$200 expenses = \$2,240

Minimum task cost = \$2,800 + \$2,240 = <u>\$5,040</u>

4. If the soils are found to be contaminated in excess of the pertinent standards, those soils should be excavated. Even if the soils are not adversely impacted, the pit area must be properly backfilled and the surface restored and revegetated.

90 ft x 70 ft x 2 ft excavation depth x 1.2 bulking factor= 15,120 ft^3 of contaminated soil/pit = 560 yds^3/pit.
560 yds^3/pit x excavation and disposal cost of \$50/yd = \$28,000/contaminated pit
Assuming only half the pits have problems, \$28,000/contaminated pit x 4 pits = \$112,000

90 ft x 70 ft x 4 ft backfilling depth = 25,200 ft^3 of clean soil/pit = 933 yds^3/pit.
933 yds^3/pit x backfilling cost of \$25/yd = \$23,333/pit
\$23,333/pit x 8 pits = \$186,667

Estimated task cost = \$112,000 + \$186,667 = <u>\$298,667</u>

5. If soil contamination has impacted groundwater, a hydrogeologic investigation of the extents of that contamination must be undertaken such that an appropriate abatement program can be developed.

Costs are indeterminate as even if a pit were to present a problem, the potential for groundwater impact is limited.

Removal of Contaminated Soil Piles

1. The contaminated soils must be removed for proper disposal.

Large soil pile has a square footprint of approximately 75 ft per side and a height of 20 ft with an approximate contaminated soil volume = 56,250 ft^3 = 2,083 yds^3.

Small soil pile has a length of 30 ft, a width of 40 ft, and a height of 6 ft with an approximate volume = 3,600 ft^3 = 133 yds^3.

Total volume of contaminated soil = (2,083 yds^3 + 133 yds^3) x $50/yd for disposal = $110,800

2. The liners must be removed and properly disposed.

Large soil pile lined area = 75 x 150 = 11,250 ft^2 of liner
Small soil pile lined area = 300 x 40 = 12,000 ft^2 of liner
Total liner area = 11,250 + 12,000 = 23,250 ft^2 of liner
Bundled to an approximate layer thickness of 0.0417 ft (1/2 inch) x 23,250 ft^2 = 969 ft^3 = 36 yds^3
36 yds^3 of liner x $50 disposal cost/$yd^3$ = $1,800

3. The vadose zone beneath the liners should be investigated for adsorbed contamination by crude oil and produced water.

Large pile is 75 ft x 75 ft = 5,625 ft2 / 1 sample for every 1,600 ft^2 (40 ft centers) = 4 samples
Small pile is 30 ft x 40 ft = 1,200 ft2 / 1 sample for every 1,600 ft^2 = 1 sample
5 samples x $175 per sample analytical cost (chloride by SM 4500, TPH by Method 8015, and BTEX by Method 8021) = $875 in laboratory costs

Professional labor to undertake sampling, collate data, and reporting 16 hours x $85/hour + $100 expenses = $1,460

Minimum task cost = $875 + $1,460 = $2,335

4. If the soils are contaminated, they should be excavated and backfilled with clean soils.

Costs are indeterminate.

5. If soil contamination has impacted groundwater, a hydrogeologic investigation of the extents of that contamination must be undertaken such that an appropriate abatement program can be developed.

Costs are indeterminate as even if an incompetent liner beneath either pile were to present a problem, the potential for groundwater impact is limited.