Job Report

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Project Name: Pollution Abatement in Region V

Period Covered: January 1, 1962 to December 31, 1962 Job No. 6

Investigation of Pollution in Chiltipin Creek

Abstract: Oil wells in the Plymouth and Sinton fields contributed 32 per cent of the 254,000 barrels of waste emptied into Copano Bay during 1962. Sixty-four per cent of samples collected from the wells' effluents contained oil in excess of 25 ppm., the maximum allowed by the Texas Railroad Commission. The portion of Chiltipin Creek that collects the waste from these two fields contained oil 59 per cent of the time.

Most of the skimming pits in Sinton Field are too small and too poorly constructed and maintained to retain the waste oil efficiently.

Most of the separators in Plymouth Field are well constructed and maintained, but several wells dispose excessive amounts of waste and separators alone will not retain the waste oil. The operators are working with chemical treatment to remove the waste oil.

Taft and Midway fields disposed 67 per cent of the total volume of waste entering Copano Bay. Oil was present in 36 per cent of the samples taken from the effluent. Only 12 per cent of the samples collected in the drainage ditches prior to disposal into Chiltipin Creek and Copano Bay contained oil. This reduction is attributed to additional skimming by a separator in the Taft drainage ditch and a 50-acre lake in the Midway ditch.

Most of the oil lost into Chiltipin Creek is filtered out of the water by debris and creek banks. Ten per cent of the samples collected at the mouth of Chiltipin Creek contained oil. This oil disperses into Copano Bay, clings to clay particles and settles, covering 25 per cent of the bottom west of the causeway. However, there is no increase in oil concentration over the previous year.

Objectives: To make routine inspections of skimming pits, measure their capacity to retain waste oil and induce oil operators to apply a pollution control program. To investigate Copano Bay and evaluate the damage done by oilfield waste.

Procedure: Five samples were collected in 250-milliliter jars each month from wells selected at random in the Sinton, Plymouth, Midway and Taft fields. Five monthly samples were also collected from six stations established in Chiltipin Creek in 1961 under Job No. F-2. These samples were analyzed for oil according to the procedure in Standard Methods for the Examination of Water, Sewage and Industrial Waste, Eleventh Edition.

Skimming pits disposal lines were checked for oil content, particularly after rainfall, with Railroad Commission personnel. Pollution notices were

issued to operators losing excessive amounts of oil from their pits and these operators were given one week to remedy the cause of the complaint. If the repairs were not considered satisfactory by Game and Fish Commission personnel, a pipeline severance was issued to the operator by the Railroad Commission supervisor. This severance prohibits the sale of oil from the well's holding tanks. Habitual violators were issued production severances which stops the production of oil.

Four stations were set up in Copano Bay to measure the dispersion distance of oil from the creek. Bottom samples were collected, agitated, digested by blending and filtered to measure oil concentration and bottom damage.

Station 1-T was established at the intersection of Taft Field drainage ditch and Chiltipin Creek. Samples were collected monthly and analyzed for oil content to evaluate the efficiency of a separator, built in the drainage ditch, to retain oil.

Station 1-M was established in the Midway Field drainage ditch before emptying into a 50-acre lake. Station 2-M was established in the drainage ditch after leaving the lake to measure the reduction in oil content by the lake.

Findings and Discussion: There were over 254,000 barrels of oilfield waste emptied into Copano Bay during 1962. Sinton Field contributed 17 per cent, Taft Field contributed 40 per cent, Plymouth Field contributed 15 per cent and Midway Field contributed 27 per cent of the total volume (Table 1). A smaller field, Mudflats Field, contributed less than one per cent of the waste.

Table 2 shows that 172 of the 440 samples collected contained oil in excess of 25 parts per million, the maximum value allowed by the Railroad Commission. Although wells in Sinton Field contributed only 17 per cent of the total volume of waste, 68 per cent of the wells sampled had effluents containing oil. The gravity separators in this field are poorly constructed and inadequate in size and numbers to skim waste oil efficiently. During heavy rainfall some of the pits flooded over, spilling the oily contents into Chiltipin Creek. On several occasions, operators cut the retainer walls to drain their pits.

Wells in Taft Field contributed 40 per cent of the total waste, but only 21 per cent of the wells sampled had effluents containing oil in excess at 25 ppm. Most of the wells in this field empty into a drainage ditch that intersects Chiltipin Creek between Stations 4 and 5 (Figure 1). A separator was built in the ditch in 1961 to retain most of the waste oil that escapes from the skimming pits at the well locations. This separator reduced the oil content in the drainage ditch to eight per cent at Station 1-T.

Wells in Midway Field contributed 27 per cent of the total volume of waste with 36 per cent of the wells sampled having effluents containing oil exceeding 25 ppm. These wells empty their waste into a drainage ditch that intersects the Aransas River, one-half mile below the mouth of Chiltipin Creek. There is a 50-acre lake at the end of the ditch that has three outlets leading to the river. Thirty-two per cent of the samples collected at Station 1-M and four per cent of the samples collected at Station 2-M contained oil (Table 3). This reduction is attributed to the oil dispersing in the lake and either settling to the bottom or being filtered out of the water by the shore.

Wells in Plymouth Field contributed 15 per cent of the total waste, with 32 per cent of the wells sampled having effluents containing oil. The majority of pits in this field are well constructed and maintained but the percentage is distorted somewhat by several wells pumping as much as 30,000 barrels of waste into pits too small to skim the waste oil properly. Most of the operators are working on chemical treatment and are constructing additional pits to remove the waste oil.

Table 3 shows the percentage of samples containing oil in excess of 25.0 ppm. at the creek stations. Forty-five per cent of the samples collected at Station 1, the beginning of waste disposal, contained excessive oil. This value was increased to 90 per cent at Station 2. Station 2 is the end point of waste disposal from Sinton Field and the high percentage of oil present shows the inefficiency of the pits to retain oil.

Waste disposal is periodic and occasional from Station 2 to Station 3. This lag allows the oil to be skimmed by debris in the creek and to be filtered out of the water by the creek's banks. Only 35 per cent of the samples collected contained oil in excess of 25.0 ppm.

Oil was present in 60 per cent of the samples collected at Station 4, the collection point of Plymouth Field's waste in the creek. There is a 40 per cent reduction in oil content at Station 5, the entrance of Taft Field's waste into Chiltipin Creek. Since Taft Field contributed only 13 per cent of the oil from its wells and an additional skimmer in the drainage ditch decreases this value to five per cent, only 20 per cent of the samples collected at Station 5 contained oil. The oil continued to filter out of the creek until only 10 per cent of the samples taken at Station 6 contained oil.

When this oil enters Copano Bay, it spreads to a thin, monomolecular layer, attaches to clay particles and then settles to the bottom. Bottom samples collected in Copano Bay indicate that 25 per cent of the bottom west of the causeway is covered with oil soaked mud (Figure 2). This could be very damaging to the fisheries resources, since Copano Bay is considered an important nursery ground for marine organisms. This oil covered bottom, however, is an accumulation of oil spills from previous years with no increase in concentration or area covered during 1961.

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Table 1
Average Salt Water Production from Fields Over a 24-hour Period

Field	Bbls. Salt Water	No. of Wells
Sinton	50,321	60
Taft	102,021	138
Plymouth	42,623	126
Midway	64,996	30
Mudflats	65	2

Table 2
Composite Results of Samples Collected from Four Fields

	Plymouth	Taft	Sinton	Midway
No. of samples collected	110	110	110	110
No. of samples containing oil exceeding 25 ppm.	35	23	75	39
% samples exceeding 25 ppm. oil	32	21	68	36

Table 3
Composite Results of Samples Collected from Creek Stations

	Station 1	Station 2	Station 3	Station 4	Station 5	Station 6	Station 1-T	Station 1-M	Station 2-M
No. of samples collected	20	20	20	20	20	20	25	25	25
No. of samples exceeding 25 ppm. oil	9	18	7	12	4	2	2	8	1
% samples exceeding 25 ppm. oil	45	90	35	60	20	10	8	32	4

Figure 1
Sampling Stations

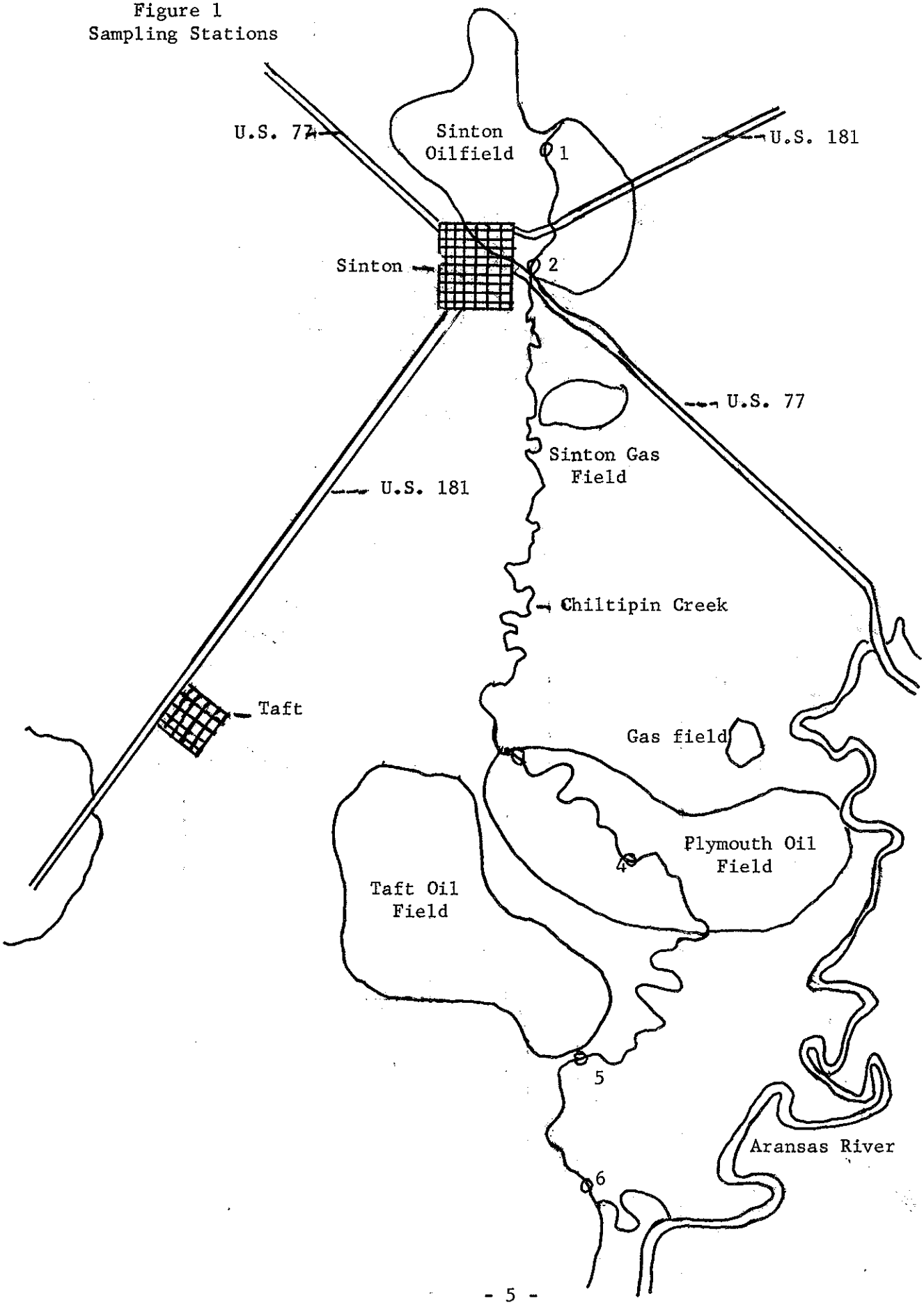

Figure 2
Bottom Sampling Stations