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CIRCULAR No. 148

AIRPLANE VIEWS OF ILLINOIS OIL INSTALLATIONS

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Reprinted from Producers Monthly, September, 1948
(Original title, "Illinois Oil from the Air")

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URBANA, ILLINOIS
1948

Airplane Views of Illinois Oil Installations

By Frederick Squires *

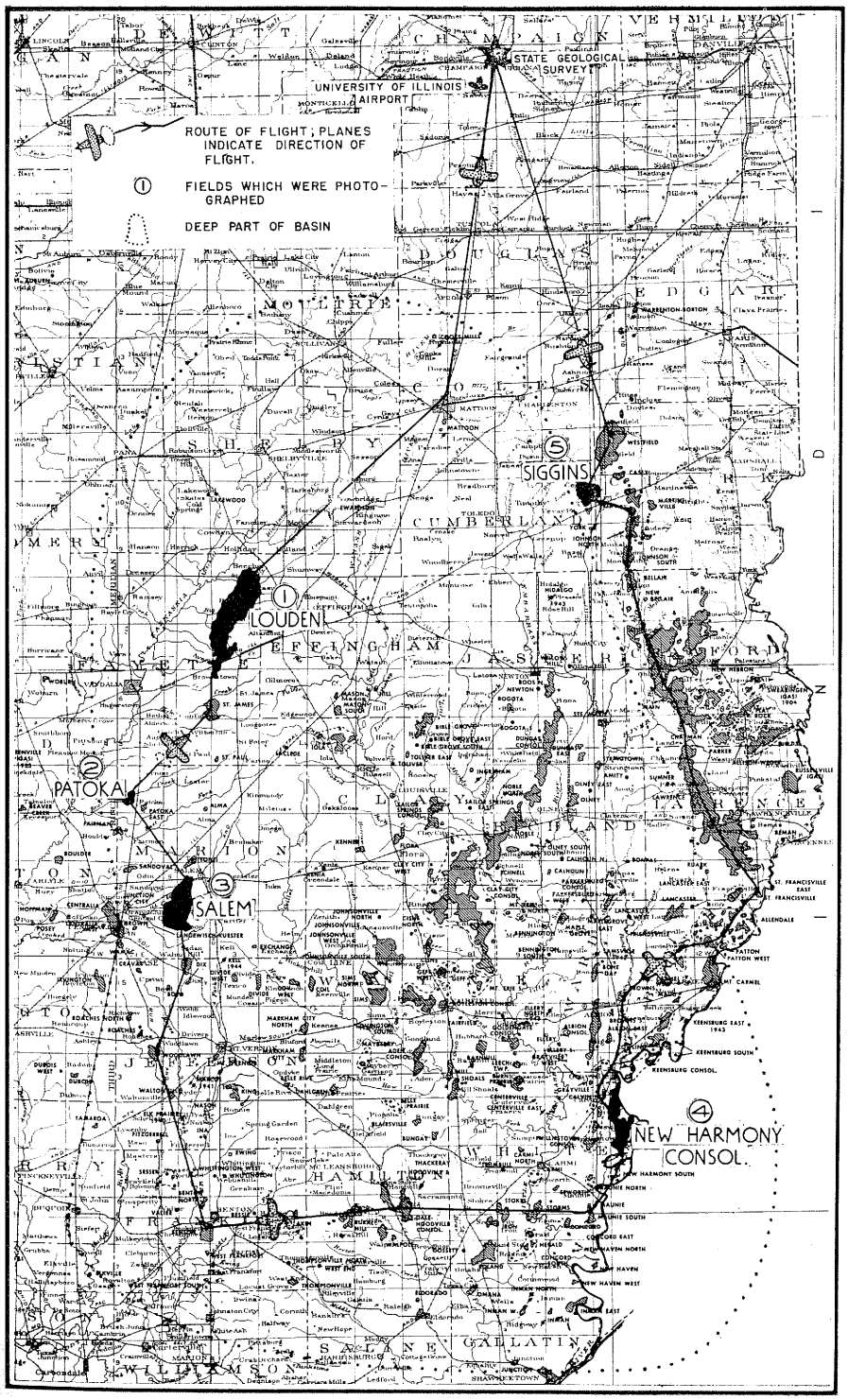

Figure 1—Map of Flight

This article is illustrated by aerial photographs taken on a flight around the Illinois oil basin with the object of drawing particular attention to fluid injection operations. The round trip is illustrated by the drawing (Fig. 1). The plants photographed were five of those where oil is being recovered through the use of water-flooding or gas injection.

Air views were taken of the Dove pressure-maintenance and gasoline extraction plant at the Louden field (Fig. 2), the water plant for the flooding operation on the Patoka field (Fig. 3), the gasoline plant and pressure-maintenance equipment at the Salem field (Fig. 4), and the pressure-maintenance equipment at the New Harmony field (Fig. 5). The last picture is the water plant for flooding the Siggins field (Fig. 6).

The plane flew above the Illinois Central Railroad tracks as far as Mattoon, where some 300 pumping jacks outline the narrow field that stretches north and south of the town. From that point it veered toward the southwest and headed for Beecher City at the north end of the Louden field.

When the Louden oil field was being drilled in 1937, the site could have been spotted from the air by the drilling derricks that stretched for a distance of several miles. Now the derricks are gone, replaced by pumping jacks powered by electricity. The aerial view (Fig. 2) shows the equipment used in the maintenance of pressure. Gas is gathered from the wells, the gasoline and other liquid products are separated from it by absorption under pressure, and the residue gas is returned to the field where it is injected into the sands through input wells.

The Louden field is now the biggest producer of oil in Illinois. It has been more skillfully engineered than the older fields, so that a higher percentage of the total amount of oil will finally be recovered. This field uses two kinds of injection: gas injection on the shallower Chester sands, and water-flooding on the deeper Devonian limestone.

A little south of the Louden field the plane crossed the St. James oilfield, then

*Petroleum Engineer, Illinois State Geological Survey. Published with the permission of the Chief, Illinois State Geological Survey, Urbana, Illinois.

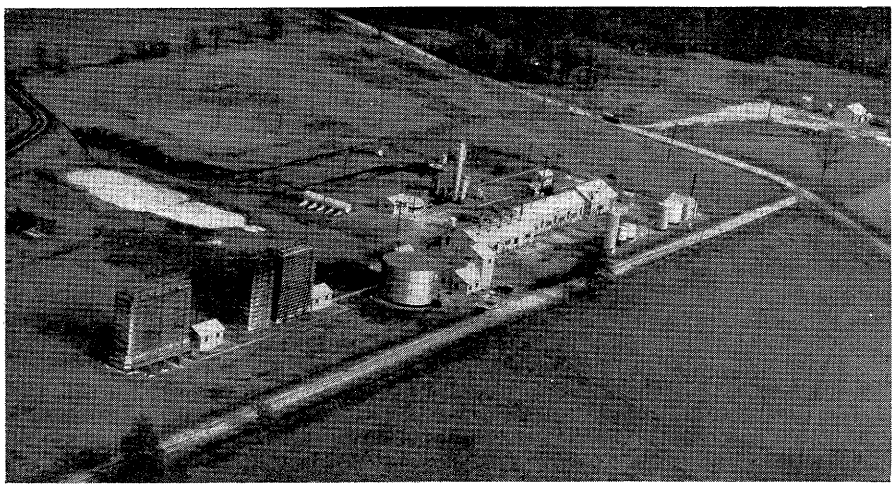

Figure 2—The Dove gasoline and gas pressure maintenance plant at Louden. The plant operates on gas taken from the field, and houses the electric generating machinery which pumps the wells in the north end of the field.

changed direction southwestward toward Patoka.

Patoka is a small oil field, but important as an Illinois pioneer: the oil-bearing structure was located by seismograph; the wells were drilled with rotary rigs, the first use of this method in Illinois; it was the first oil field to use wide spacing between water wells for flooding; and it was the first one to use salt water as the flooding liquid. The oil recoveries from the Patoka field hold the present record for the water-flooding process in Illinois.

From Patoka the plane turned southeast toward Salem, the most spectacular oil field seen on the flight. A regiment of derricks rises above what was once the third largest producing field in the United States. In this field gas is being injected into the upper sands.

The clear flat blue color of Lake Centralia was sharply visible from the plane. Clustered around churches and right-of-ways are many closely spaced wells that were drilled in the absence of a state law to check a wasteful practice. Several large gasoline plants punctuate the scene, and little villages for oilfield workers are outlined in geometric patterns.

Farther south the plane passed over the Dix field, where the original pressure on the Bethel sand is being restored in part by water injection at the contact of oil and water in the outer edge of the producing sand. Next came the Woodlawn field, where gas repressuring is being applied, and to the south the Benton field, the ownership of which has been consolidated in preparation for what promises to be a highly successful water-flooding operation.

Wheeling eastward, the plane passed over the Rural Hill and Dale Hoodville fields, both of which are likely possibilities for water-flooding. At the Maunie South field near Wabash River the plane turned north. The Maunie South oil comes from the Tar Springs sand. In this oil field, engineers have pioneered a new type of flood in which only widely spaced old wells are used. Its spectacular success has taught a valuable lesson in water-flooding technique.

From Maunie the plane flew northward along the "Banks of the Wabash" to the New Harmony oil field. The Indiana side of the river was once the site of the Owens Cooperative settlement. Owens himself was a geologist of note, and it is an interesting fact that he lived almost over a great oil field.

At the south end of the New Harmony field a water-flood operation on the Waltersburg sand is working upward from the low part of the oil-bearing structure. The whole field is under pressure maintenance with gas through a cooperative agreement between interested producers, a profitable "New Harmony." The photograph (Fig. 5) shows a spectacular view of the gasoline and pressure-maintenance plant at the edge of the plateau above the Wabash Valley plain.

From the north end of the New Harmony field the Calvin North oil field was visible to the west. This area is being water-flooded. The plane flew on northward to the Browns field, then turned northeast toward Friendsville, Allendale, and St. Francisville. At St. Francisville the plane was flying over the field where natural encroachment of edge-water in the Tracy sand multiplied oil production. The deduction that artificial floods in Illinois would reproduce the favorable results of this and other natural and accidental floods resulted in undertaking the present successful intentional flooding operations.

From St. Francisville the plane took a course a little west of north most of the way back to Urbana. In its flight it passed over much of the old southeastern oil field which rests upon the crest of the LaSalle anticline through Lawrence, Crawford, and Clark counties. In central Crawford County there is a water-flooding operation on the Robinson sand. The whole Bellair pool at the north edge of Crawford County is being prepared for a new water-flood. Near Casey the last picture was taken (Fig. 6), the water supply plant at the Siggins oil field, where the Forest Producing Corporation

Figure 3—The Water Plant at the Patoka Water Flood Operation. The water well pumps from the Tar Springs formation. The salt water is aerated above the most distant pond, and settled there. It is treated in an accelerator and filtered in the largest of the buildings. The water is distributed by centrifugal pumps to the water input wells throughout the field.

The stock tank shown in the picture is used for back washing.

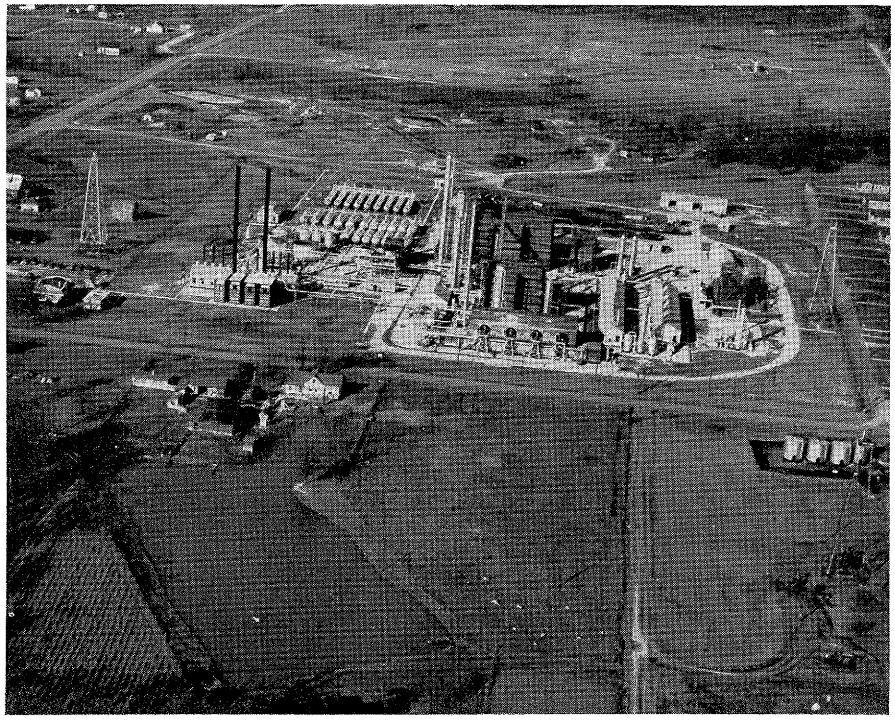

Figure 4—The gasoline and pressure-maintenance plant in the Salem field. Gas is gathered from the oil wells and treated by compression and absorption for the removal of the liquid contents, and then returned under pressure to the input wells throughout the field.

and the Pure Oil Company are making water-flooding history. These many million dollar operations are a heartening expansion of the pioneer repressuring of the Mumford farm and water-flooding of the Kraft farm made by the writer many years ago.

The plane veered northeast to pass over the Westfield oil field, now largely abandoned but historically important because it was the first great oil producing field in Illinois.

This flight around the major oil-producing fields in Illinois gives some idea of the areas of Illinois that are underlain by oil and the 25,000 wells which bring it to the surface. Another flight across the center of the basin, from Willow Hill in Jasper County down the length of the Noble anticline to Fairfield in Wayne County, would also be impressive.

The cumulative volume of oil which has been produced almost within the boundaries of this flight is 1 1/3 billion barrels. The area is still yielding 172 thousand barrels a day. Not only has the past production been impressive, but the future opportunities for additional oil from water-flooding and gas repressuring are vast. Every barrel of this oil is new wealth.

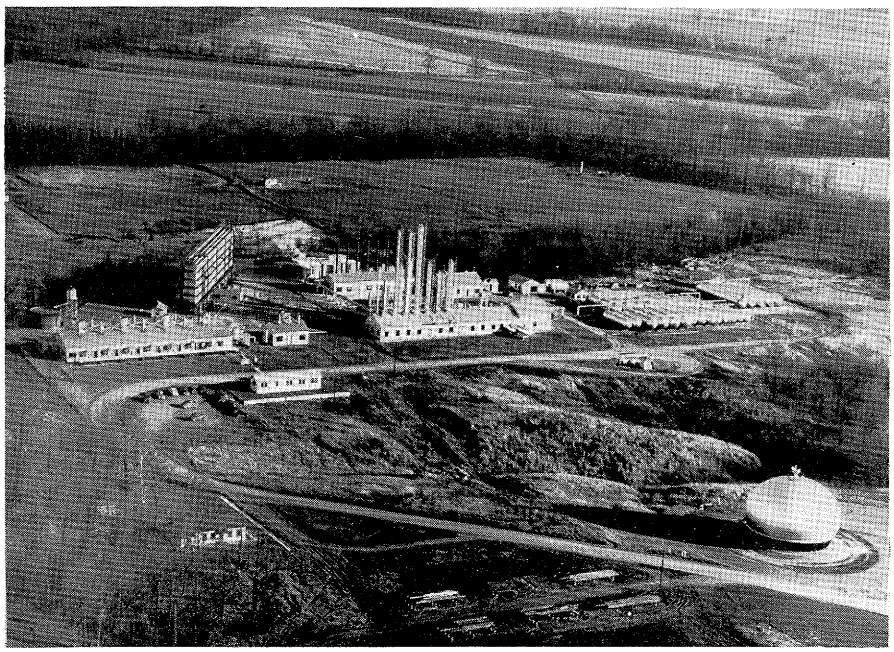

Figure 5—The New Harmony gasoline and pressure maintenance plant. Gas is brought from the field to the compressors in the long low building at the extreme left. Here it is compressed, then passed through the absorption towers to remove the liquids, and it is then returned to the input wells throughout the field.

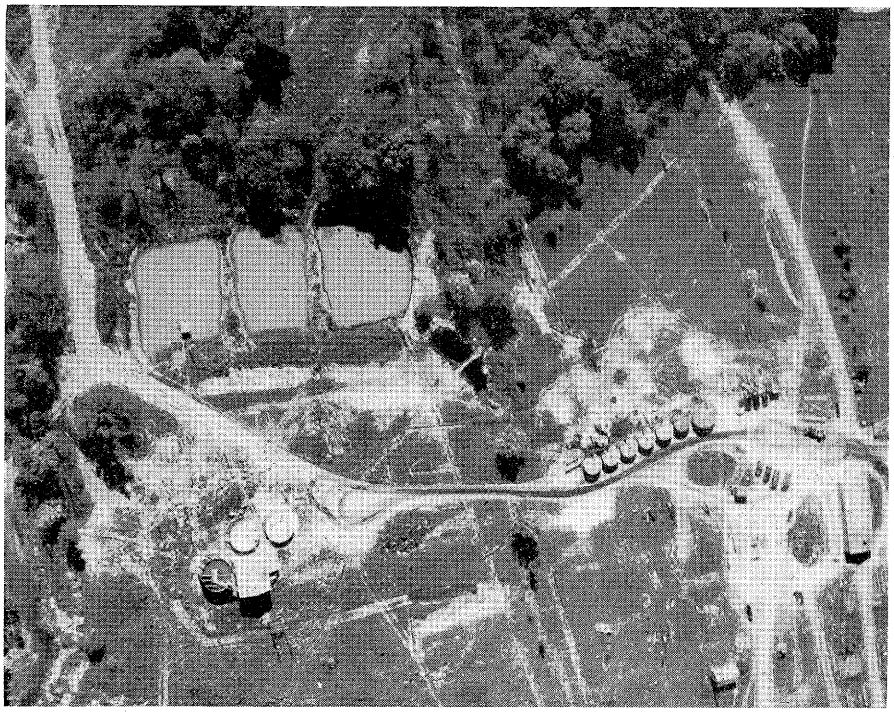

Figure 6—Brine Treating Plant at Siggins Field. Brine from the separators is collected in the first pond on the right of the group of three. From here it gravitates to the pond on the left where it is picked up and pumped to the coagulation and settling tank. This is followed by filtration and storage in the twin covered tanks. Centrifugal pumps take the water from storage and distribute it to the input wells throughout the field.