

Intercontinental Potash Corp. (USA)
Subsidence Monitoring Plan

Ochoa Project
Lea County, New Mexico



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1 Introduction

Intercontinental Potash Corp. (USA) (ICP) plans on mining and processing polyhalite in the vicinity of the Carlsbad, New Mexico Potash Region. ICP's Ochoa Project is located about 60 miles east-southeast of Carlsbad, New Mexico, and less than 20 miles west of the Texas-New Mexico state line. State of New Mexico leases and Bureau of Land Management (BLM) exploration permits total approximately 103,000 acres. ICP's leases and exploration permits are shown on Figure 1.

The Ochoa Project polyhalite is located within the Permian Basin of the Great Plains physiographic province. Evaporites in New Mexico and Texas occur in the Permian sedimentary basin.

ICP's overall strategy for subsidence monitoring and management includes the following:

- Measure baseline information – ICP will establish background data for the surface above the mining area and significant infrastructure features within 1,500 feet of the mine and 1 mile of the shaft.
- Monitor the effects of mining – Monitor subsidence using a grid pattern, stratifying locations to target infrastructure and oil and gas wells.
- Regularly assess and interpret monitoring – Inspection and monitoring data will be reviewed and analyzed to identify any variations from predictions or unexpected anomalies.
- Report monitoring results quarterly.
- Mitigate as necessary.

Because polyhalite has only recently been mined underground, and only in one or two mines, worldwide, geotechnical and subsidence data is not available to ICP to determine subsidence behavior at other mines. This Subsidence Monitoring Plan is, therefore, designed for the first 5 years of operations, after which, ICP will evaluate mine geotechnical data and subsidence monitoring data to better predict Ochoa Mine-induced subsidence. ICP will update this plan to reflect this new information.

2 Project Description

The Ochoa Project includes underground mining operations with an adjacently located process plant and a remotely located rail load-out facility. The mine and processing facilities location are shown on Figure 2. The rail load-out facility is approximately 22 miles east of the proposed mine and will not experience subsidence from mine operations.

The ore will be mined using continuous miners in a room and pillar method. The ore will be transported via a conveyor located in a decline ramp to the processing plant on the surface. Once

processed, the finished products will be transported via truck and trailer to the Jal facility where they will be loaded onto railcars for shipment to market.

As part of a feasibility study (FS), ICP is currently evaluating geotechnical data to determine underground pillar sizes and subsidence potential due to mining. The results of this study will be available in 2014. ICP will revise this Subsidence Monitoring Plan when the mine design is complete. The revised plan will contain the surveyed locations of the subsidence monitoring monuments.

ICP plans on mining at a 60% extraction rate in areas with oil and gas wells and 90% in areas without oil and gas wells. Subsidence is not anticipated in areas with 60% extraction, but could be up to 4 feet in areas of 90% extraction. Initially, ICP will monitor subsidence in the 90% and 60% extraction areas.

3 Monitoring Plan

ICP will use a subsidence monument monitoring approach to measure ground movement to determine whether there has been Ochoa Mine-induced ground movement. ICP will initially install surface subsidence monitoring stations in a grid pattern to monitor subsidence for the first 5 years of mining. The grid orientation will be based on the final underground mine plan.

Because this a new mine without existing data and ICP does not anticipate subsidence within the first 5 years of mining, ICP will use the initial monitoring to refine the subsidence monitoring strategy. Once mining has started, additional geotechnical data will be collected. Evaluation of these data may result in mine design changes, show where subsidence is more or less likely, or indicate other factors which could influence the monitoring design.

The subsidence monitoring monuments will be installed before mining begins. ICP will install approximately 55 subsidence monitoring monuments to accommodate the first 5 years of mining. ICP has used a standard grid to determine monitoring locations, but will reevaluate the placement of monitoring monuments closer to the start of active mine operations. This will allow ICP to stratify monument locations to accommodate new mine and surface infrastructure (wells, roads, etc.), updated mine design (location of pillars and other mine infrastructure), and stakeholder concerns. Table 1 lists proposed surface monument locations and the infrastructure features that are addressed by this monitoring. Monument monitoring points will be adjusted to nearby for infrastructure features as listed in Table 1. Additional monuments will be installed as the mine expands, based on the extraction rate and results of early subsidence monitoring. The

proposed monitoring network, for the first five years is shown on Figure 3, and the proposed monitoring points are listed in Table 1.

ICP included a 1,500 foot buffer around the mine and a 1-mile buffer around the shaft area for subsidence monitoring. ICP calculated the area around the mine where subsidence could be expected using the following equation and based on an expected angle of draw of 25° for the Ochoa Project (Abel 2008). Based on this calculation, subsidence is not expected at locations more than approximately 700 feet from the mine boundary.

$$\text{Tan}(\theta) = \frac{x}{D_m}$$

Where:

D_m = Average Mine Depth

θ = Angle of Draw

x = Distance of mitigation

$$\text{Tan}(\theta) = \frac{x}{1,500}$$

$$x = 1,500 \text{ ft} \times \tan(25^\circ)$$

$$x = 1,500 \text{ ft} \times 0.466$$

$$x = 699.462 \text{ ft}$$

Because polyhalite extraction will target a 60% extraction rate within a 1,500 foot radius of active oil and gas wells, subsidence around oil and gas wells is not anticipated. To determine whether there is differential subsidence attributed to Ochoa Project mining, as oil and gas extraction can cause subsidence without any mining activity, ICP will place a subsidence monument near each existing oil and gas well to establish an elevation baseline and monitor subsidence at these wells. Additionally, when the mine design is finalized, ICP will adjust the monitoring locations shown on Figure 3 for any changes to mine design and surface features. This may result in additional monuments at roads and other infrastructure features.

Prior to installing the monitoring network, ICP will identify surface and subsurface structures that could be affected by mine-induced subsidence. This will include oil and gas wells, pipelines,

buildings, roads, transmission lines, ponds, etc. Figure 4 illustrates current, publicly available infrastructure in the mine and shaft areas.

3.1 SURVEYING

A baseline survey will be conducted, before active mining begins, using GPS survey methods. All surveys will be conducted in accordance with New Mexico Administrative Code 12.8.2 and will have the same degree of accuracy. ICP will conduct monument surveys once per quarter and will visually inspect surface infrastructure monthly. If results warrant, ICP will change the monitoring frequency, in consultation with BLM. Potential reasons for changing monitoring frequency could include more or less subsidence than expected. Unexpected subsidence would be a reason to increase monitoring, and no subsidence would be a reason to decrease monitoring. A once per quarter monitoring frequency is used by other mines in the Carlsbad area and is adequate to determine whether there is Ochoa Mine-induced subsidence for the first 5 years of monitoring.

3.2 MONITORING REPORTING

Quarterly monitoring results will be reported to BLM. ICP will analyze the results and provide the analysis along with a table of quarterly elevation measurements of the subsidence monitoring monuments and compare results to the baseline and previous quarters. In areas where the results indicate a potential impact to surface or subsurface structures, ICP will verbally notify the BLM within five business days. Reports will be delivered to the BLM on the last day of January, April, July, and October of each year. The January report will include data from the entire year and will be provided to BLM and affected infrastructure owners.

ICP will evaluate Ochoa Project-induced subsidence related impacts to pipelines, structures, water or oil and gas wells, and other infrastructure in and around the mine plan area. If shallow groundwater well owners request, ICP will place a monument at their well and monitor water levels. If the evaluation indicates that Ochoa Mine-induced subsidence is impacting surface features or shallow groundwater wells, ICP will notify BLM and affected infrastructure owners, and consider mitigation options.

3.3 SUBSIDENCE MITIGATION

ICP will initiate subsidence mitigation if Ochoa Mine-induced subsidence impacts the structural integrity of pipelines, structures, water or oil and gas wells, or other infrastructure.

Table 1 ICP Subsidence Monitoring Monument Locations – First Five Years of Mining

Point	Easting	Northing	Purpose
SM-01	764000	448000	Mine
SM-02	766000	448000	Mine/Pipeline
SM-03	768000	448000	Mine
SM-04	770000	448000	Mine
SM-05	770000	450000	Mine
SM-06	772000	448000	Mine/Bell Lake Road
SM-07	772000	450000	Mine
SM-08	772000	452000	Mine
SM-09	774000	448000	Mine/Bell Lake Road
SM-10	774000	450000	Mine
SM-11	774000	452000	Mine
SM-12	776000	448000	Mine
SM-13	778000	448000	Mine/Brininstool Road
SM-14	780000	442000	Mine/SH 128/Pipeline/Transmission Line
SM-15	780000	444000	Mine/Shaft
SM-16	780000	446000	Mine
SM-17	780000	448000	Mine
SM-18	782000	442000	Mine/SH 128/Pipeline/Transmission Line

Point	Easting	Northing	Purpose
SM-19	782000	444000	Mine/Mine Waste Area
SM-20	782000	446000	Mine/Bell Lake Road
SM-21	782000	448000	Mine
SM-22	784000	442000	Mine/SH 128/Pipeline/Transmission Line
SM-23	784000	444000	Mine
SM-24	786000	442000	Mine/SH 128/Pipeline/Transmission Line
SM-25	786000	444000	Mine
SM-26	784000	446000	Mine/Potential Oil and Gas Well
SM-27	786000	446000	Mine/Potential Oil and Gas Well
SM-28	784000	448000	Mine Buffer Area
SM-29	784000	440000	Mine Buffer Area
SM-30	786000	440000	Mine Buffer Area
SM-31	778000	446000	Mine/Potential Oil and Gas Well
SM-32	776000	446000	Mine/Potential Oil and Gas Well
SM-33	776000	444000	Mine/Shaft Buffer Area
SM-34	778000	444000	Mine/Brininstool Road
SM-35	778000	442000	Mine/Brininstool Road
SM-36	776000	442000	Mine/Shaft Buffer Area
SM-37	776000	440000	Mine/Shaft Buffer Area

Point	Easting	Northing	Purpose
SM-38	778000	440000	Mine/Shaft Buffer Area
SM-39	780000	440000	Mine/Shaft Buffer Area
SM-40	782000	440000	Mine/Shaft Buffer Area
SM-41	778000	438000	Mine/Shaft Buffer Area
SM-42	780000	438000	Mine/Shaft Buffer Area
SM-43	774000	446000	Mine/Potential Oil and Gas Well
SM-44	772000	446000	Mine/Potential Oil and Gas Well
SM-45	770000	446000	Mine/Potential Oil and Gas Well
SM-46	768000	446000	Mine/Potential Oil and Gas Well
SM-47	766000	446000	Mine/Potential Oil and Gas Well
SM-48	764000	446000	Mine/Potential Oil and Gas Well
SM-49	762000	446000	Mine/Potential Oil and Gas Well
SM-50	762000	448000	Mine/Mine Buffer Area
SM-51	764000	450000	Mine/Transwest Pipeline
SM-52	762000	450000	Mine/Mine Buffer Area
SM-53	787800	446000	Mine/Potential Oil and Gas Well
SM-54	787800	444000	Mine/Shaft Buffer Area
SM-55	787800	442000	Mine/Shaft Buffer Area
SM-56	786000	448000	Mine/Shaft Buffer Area

Point	Easting	Northing	Purpose
SM-57	788000	438000	Mine/Shaft Buffer Area

A site-specific subsidence mitigation plan would be developed, discussed with the infrastructure owner, and provided to BLM.

Examples of mitigation measures could include the following:

- Notifying potentially affected owners;
- Installing additional monitoring monuments around the infrastructure;
- Increasing the frequency of monitoring at the infrastructure; or
- Working with the owner to alter, repair, or relocate the infrastructure.

3.4 COORDINATION WITH STAKEHOLDERS

ICP will work with landowners, oil and gas operators, and other infrastructure owners to determine where sensitive areas and equipment are located. ICP has in place Memoranda of Understanding (MOUs) with several oil and gas operators to discuss operational plans and mitigations and will work with infrastructure owners regarding MOUs for pipelines and other affected infrastructure. Prior to installing the subsidence monitoring network, ICP will contact infrastructure owners regarding mining plans, subsidence concerns, and the monitoring plan.

4 References

Abel, John F., Jr. 2008. Rock Mechanics Mining Review. Prepared for Trigon Uranium (now ICP) for the Ochoa Polyhalite deposit.

Figure 1 ICP Leases and Prospecting Permits

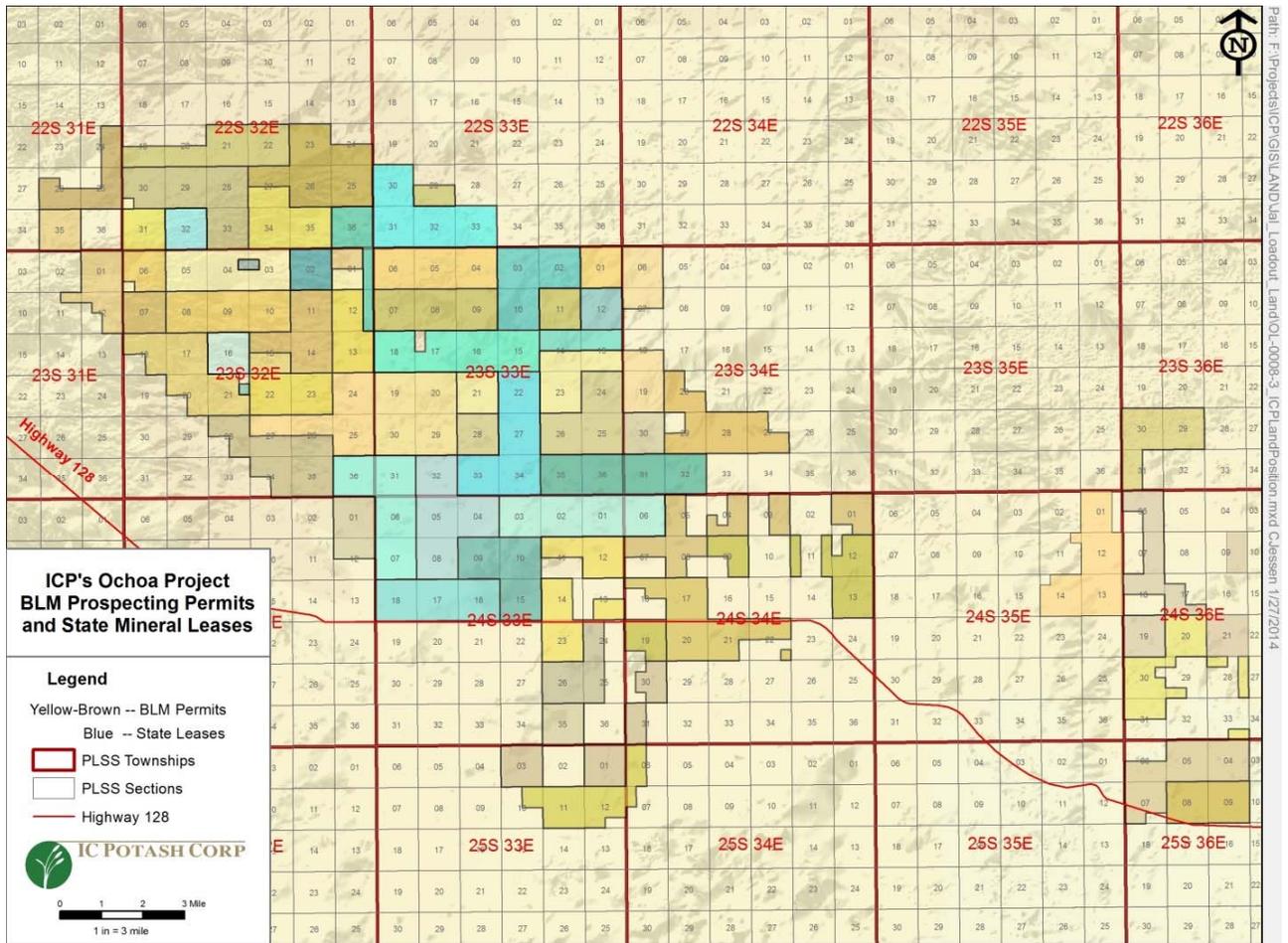


Figure 2 ICP Ochoa Mine and Processing Facilities Location

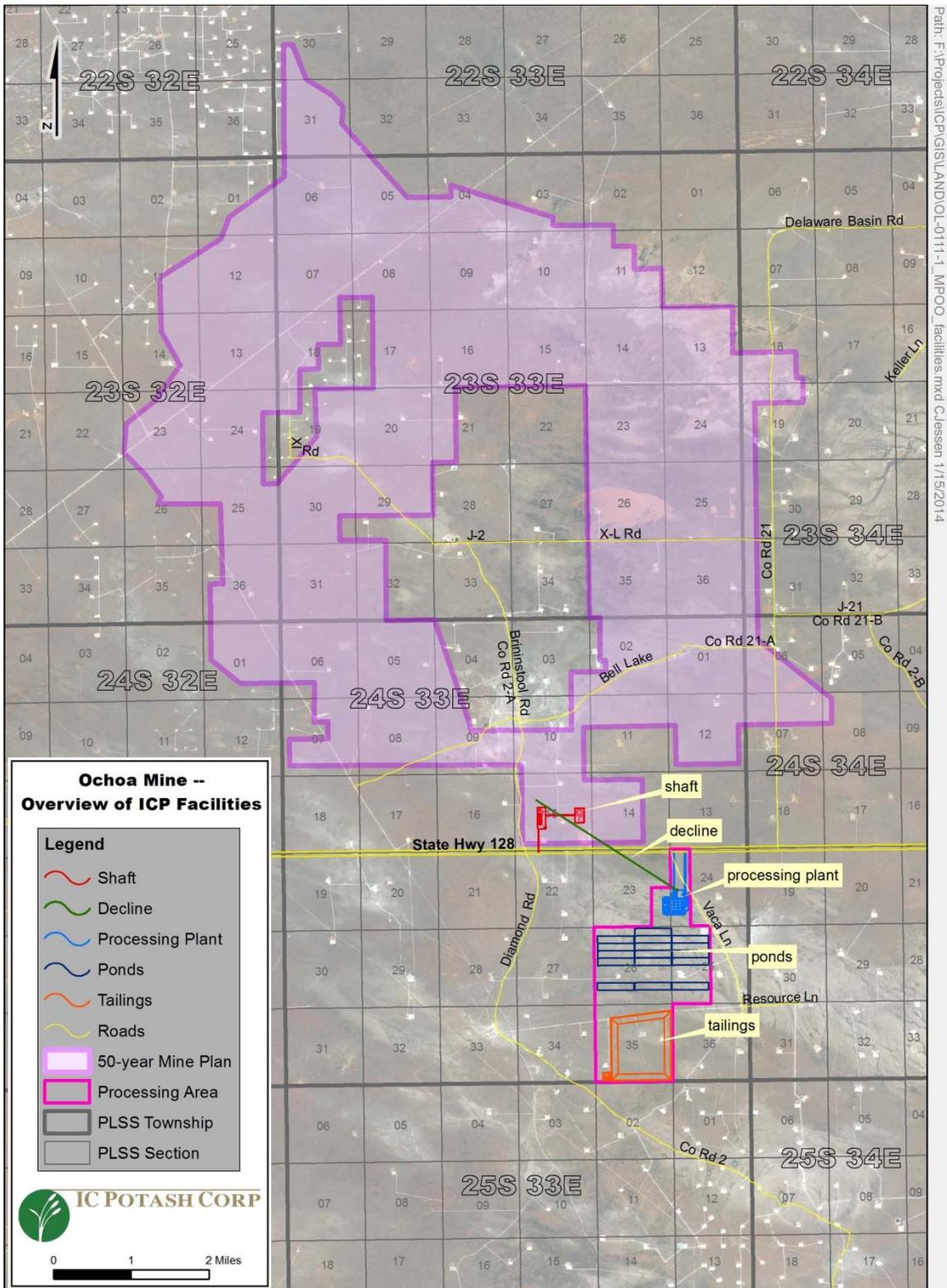


Figure 3 ICP Subsidence Monitoring Monument Locations – First Five Years of Mining

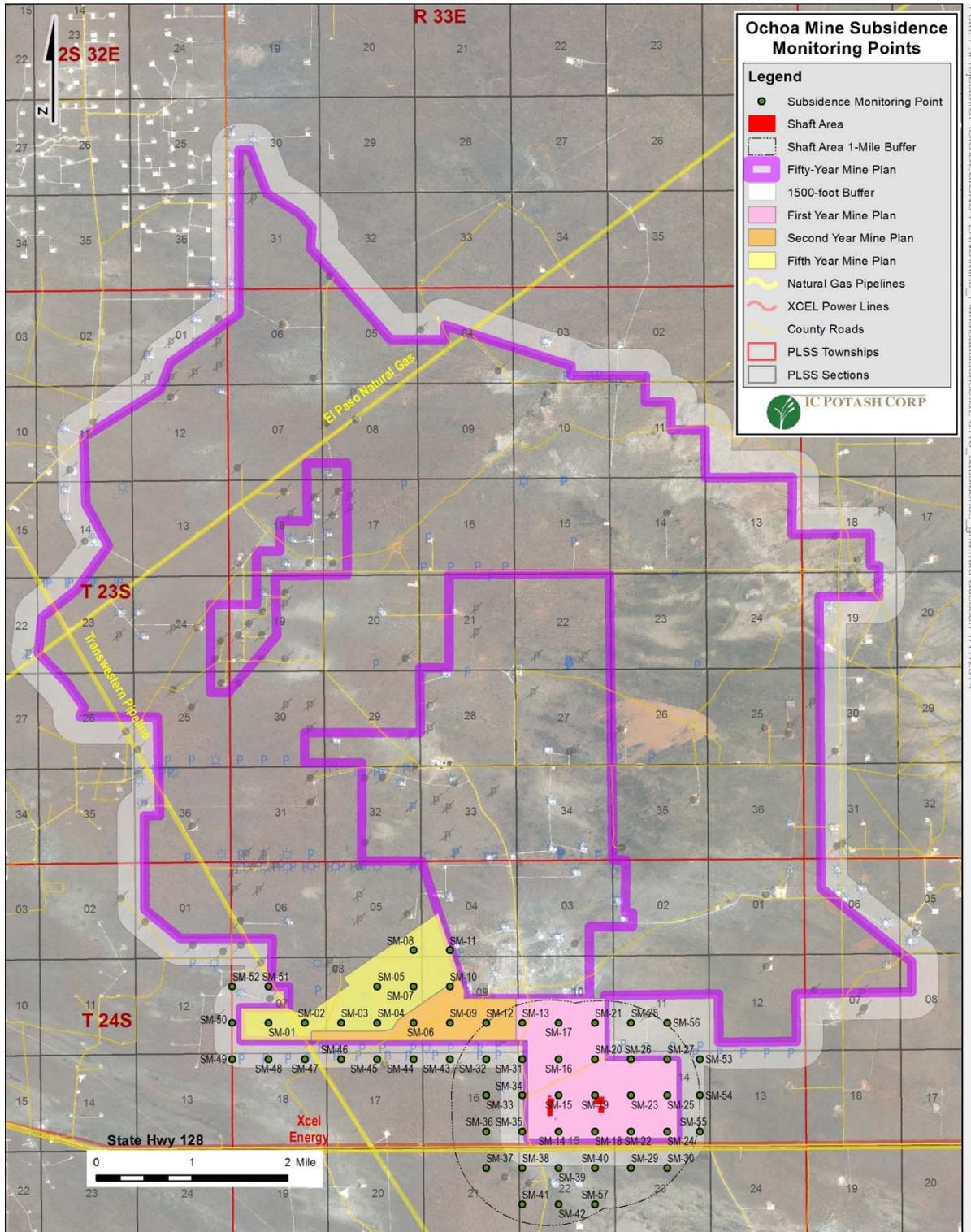


Figure 4 Infrastructure in the Ochoa Shaft and Mine Areas

