VALLEY FEVER REPORT
FOR THE
COTTONWOOD SAND MINING PROJECT
PDS2018-MUP-18-023/PDS-2018-RP-18-001
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Table of Contents

1.0 Introduction 1
1.1 Project Location and Description 1
2.0 Valley Fever 3
2.1 Coccidioides Spores Life Cycle 4
2.2 Symptoms of Valley Fever 5
2.3 Treatment of Valley Fever 6
2.4 Valley Fever Cases 6
3.0 Existing Conditions 8
3.1 Existing Setting 8
4.0 Potential for Exposure 9
5.0 Measures to Reduce Potential Exposure 9
6.0 Conclusion 10
7.0 References 10

List of Figures

Figure 1.1.1 Cottonwood Sand Mine Site Vicinity 2
Figure 2.0.1 Areas in the U.S. Endemic for Coccidioidomycosis 4
Figure 2.1.1 Coccidioides Spores Route of Exposure 5
Figure 3.4.1 Cottonwood Sand Mine Zip Codes 7

List of Tables

Table 1. San Diego County Valley Fever Incidence Rates 2008 – 2017 8

1.0 Introduction

The Cottonwood Sand Mine Project (project) is proposing to extract 5.7-million tons of marketable mineral resources on a 280-acre property within the Sweetwater Valley of San Diego County. The twelve-year project would include mineral extraction for ten years and completion of reclamation activities for an additional two years. Excavated or otherwise disturbed lands would be reclaimed to include open space and construction of recreational trails on 230 acres of the site.

This technical report has been prepared to provide information on the potential for contracting coccidioidomycosis (Valley Fever) by employees or nearby residents. Included in the report is a discussion about the spores of the soil fungus (Coccidioides) that causes the Valley Fever, the life cycle of the fungus, where the fungus is typically known to occur and symptoms of Valley Fever. Also included are statistics for the County of San Diego and suggested methods to reduce potential exposure of project employees and the public.

1.1 Project Location and Description

The project site is located adjacent to Rancho San Diego, within the southwestern portion of the unincorporated area of San Diego County (Figure 1.1.1). Willow Glen Drive parallels the north side of the project site and Steele Canyon Road bisects the western portion of the site. The western edge of the project area is approximately 600 feet east of the intersection of Willow Glen Drive and Jamacha Road. The project site extends approximately 1.7 miles to the east of that intersection. The project site is currently occupied by the Cottonwood Golf Club which has operated two 18-hole golf courses on the property since 1963. The two golf courses are referred to as the Lakes course and the Ivanhoe course and collectively referred to as Cottonwood Golf. The Lakes course was closed in the summer of 2017.

Extractive operations for the proposed project are expected to continue for approximately 10 years with a total marketable production of 3.8-million cubic yards (5.7-million tons). Project development will occur through three mining phases and a fourth (4th) phase for final reclamation. Mineral extraction will generally proceed in a southwest to northeast direction.

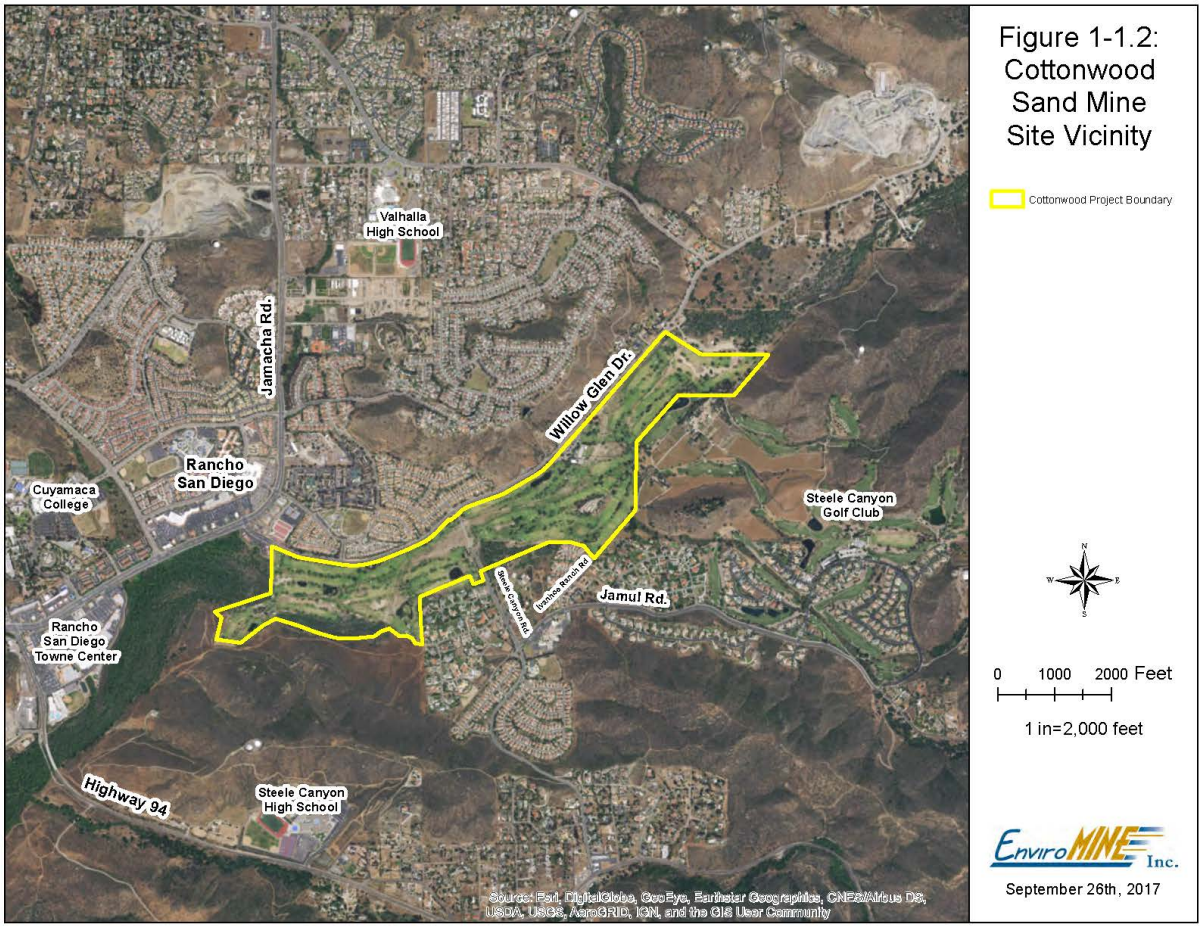
Initially, a bulldozer would push the top 4 to 6-inches of topsoil into stockpiles located at the edges of the area to be excavated. Water will be applied as needed to these stockpiles to prevent dust or covered with plastic tarps. Wheeled, front-end-loaders will then mine the materials to approximately one foot above the existing water table and load directly into a conveyor hopper. In areas where excavation extends below the water table (to a maximum depth of 40 feet below ground surface), excavators would be utilized for pit excavation. The conveyor line will deliver the material directly to the processing plant, near the north-central portion of the project site, where the material will be washed.

In the last phase final reclamation, cleanup and equipment removal from the site would be completed. Reclamation activities would include grading, habitat restoration and revegetation. Areas disturbed by the mining operation would be progressively

reclaimed beginning in year 2 as mining proceeds to the east. All areas of the golf course disturbed by mining would be reclaimed. Reclamation would consist of removing all golf course features in the mined area, widening the channel of the Sweetwater River and backfilling areas that are excavated to depths deeper than the finished elevation of the widened channel with wash fines, other non-processable excavated material, and stockpiled topsoil.

The entrance to the project site is 0.2 miles northeast of the intersection of Willow Glen Drive and Steele Canyon Road with an address of 3121 Willow Glen Drive, El Cajon, CA 92019. Willow Glen Drive will serve as the primary route for the project.

Figure 1.1.1- Cottonwood Sand Mine Site Vicinity



2.0 Valley Fever

Valley Fever is most often caused by inhalation of the spores of the Coccidioides fungus and usually affects the lungs of susceptible individuals. In extremely rare cases, people can get the infection from other sources, such as:

- an organ transplant if the organ donor had Valley fever
- inhaling spores from a wound infected with Coccidioides
- contact with objects (such as rocks or shoes) contaminated with Coccidioides (CDC, 2020b)

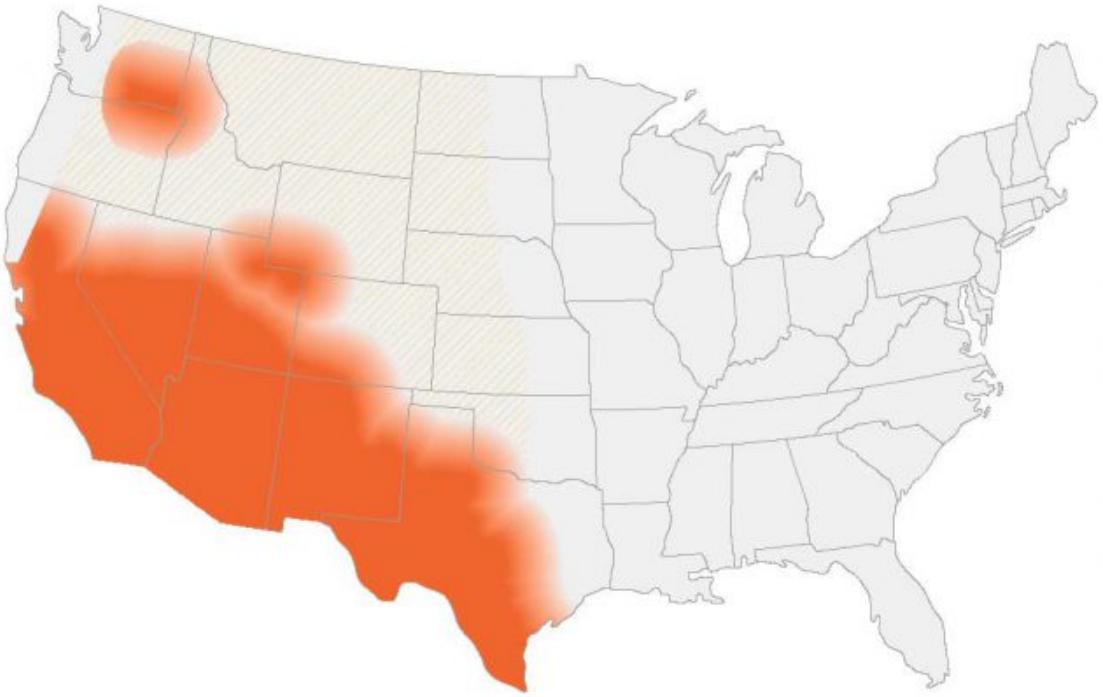
This fungus and the spores are found in the upper 10 to 30 cm (4 to 12 inches) of undisturbed soils (Brown, J., et al, 2013) and, with some exceptions, in arid and semiarid areas. It is dormant during extended dry spells and becomes active during late winter and early spring rains which causes the fungus to germinate and grow. When temperatures rise, the Coccidioides fungus has the unique ability to form spores which then can survive the dry, hot summers.

Soil characteristics that are more likely to support Coccidioides include soils that are undisturbed, alkaline, silty, well aerated with a relatively high, water holding capacity, sparsely vegetated and have a high salinity level. Areas that are less likely to support Coccidioides include cultivated soils, heavily vegetated areas, higher elevations (above 7,000 feet), areas where commercial fertilizers have been applied, areas that are continually wet, paved or oiled, soils containing abundant microorganisms and heavily urbanized areas where soil has been previously disturbed (Evans, V & Armstrong, S., 2018).

Regions where the fungus is endemic are usually arid to semiarid with mild winters and extended hot seasons (USGS, 2000). Areas endemic for Coccidioides include portions of the southwestern United States, northern Mexico (Figure 2.1.) and parts of Central America and South America. In 2019 the California counties with the highest annual case rates of Valley Fever were in the southern Central Valley and central coast areas of the state and include Fresno, Kern, Kings, Madera, Ventura, San Luis Obispo, and Tulare (CDPH, 2020).

San Diego County is a suspected endemic area for Coccidioides (CDC, 2014).

Figure 2.0.1- Areas in the U.S. Endemic for Coccidioidomycosis[1]



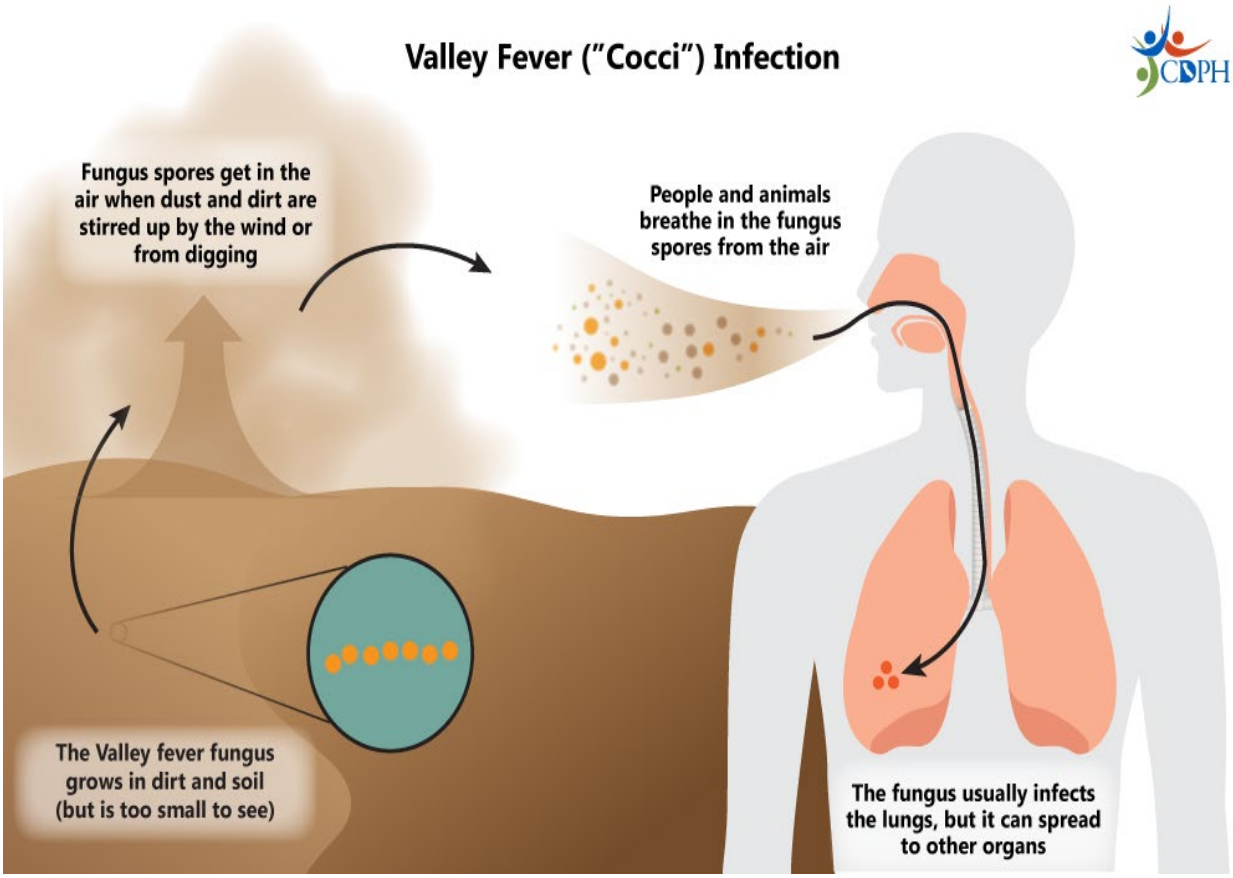
[1] This map shows CDC's current estimate of where the fungi that cause Valley fever live in the environment in the United States. The disease is also common in northern Mexico, including areas along the U.S. border, as well as parts of Central and South America (CDC website, 2020 https://www.cdc.gov/fungal/diseases/coccidioidomycosis/causes.html)

2.1 Coccidioides Spores Life Cycle

The life cycle of the Coccidioides spore is linked with the changes in local climate conditions. Coccidioides spores start their lives within fungus in suitable soils and begin to grow after being in contact with water, usually during the spring months after winter rainfall has ended (Brown, 2013). During the dry months, the hyphae (branching filaments) of the fungus begin to desiccate and mature into arthroconidia (spores), which can become airborne and inhaled. Once arthroconidia (spores) are inhaled and settle into the lungs, the spore spherules begin to divide internally until they are filled with endospores. Once the spherules ruptures, the endospores are released and disseminated within the surrounding tissue increasing the extent of infection (Figure 3.1.1). Over time, the spores redevelop into new spherules and the cycle repeats itself. (CDC, 2020a). Figure 3.1.1 illustrates the general life cycle of Coccidioides spores. Valley Fever can also be contracted by domestic and wild animals (USGS, 2000).

Because Valley Fever is mainly contracted through inhalation of airborne spores that are present in suitable soil, dust emissions are an indicator (but not definitively) that spores also might be present in the airborne material. However, due to the spores' very small size and buoyancy, spores can be transported long distances and may be present in air that appears quite clear. Still, dust control is considered the primary tool to reduce potential exposure. (CDPH, 2017; USGS, 2000)

Figure 2.1.1- Coccidioides Spores Route of Exposure



Source: California Department of Public Health website: https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/Coccidioidomycosis.aspx

Currently, there are no commercially available tests to detect Coccidioides in soil. Although research is being done to understand more about the fungus' habitat and effects of weather and climate on growth, the testing methods used do not always detect the spores even when they may be present (CDC, 2017).

2.2 Symptoms of Valley Fever

An estimated 150,000 Coccidioides infections occur each year in the United States. This rate is estimated as it is thought that thousands of cases are not reported because approximately sixty percent of these infections do not produce any symptoms (CDPH, 2015). Infection occurs when a spore is inhaled by susceptible people and animals.

Persons expressing symptoms of Valley Fever comprise approximately 40 percent of cases and usually show symptoms within one to three weeks after exposure (CDC, 2020c). Symptoms of Valley Fever are flu-like and include fatigue, cough, difficult or labored respiration, headache, night sweats, muscle aches, and rashes.

In approximately 5 to 10 percent of cases, individuals showing symptoms of Valley Fever can develop complications or chronic pulmonary diseases and in 1 percent of

those chronic pulmonary patients the infection can disseminate beyond the lungs to other parts of the body. With Valley Fever this usually occurs within the first six to 12 months after the initial illness. Higher rates are observed in certain risk groups. Bones/joints, soft tissues and membranes covering the brain and spinal cord are most commonly affected by disseminated disease (CDC, 2020c).

Risk groups include people in endemic areas who have occupations or engage in activities that exposes them to dust. Risk factors for severe or disseminated Valley Fever include individuals of African American or Filipino ethnicity, those with HIV/AIDS, use of immunosuppressive medications, organ transplant, diabetes mellitus, or pregnancy (CDC, 2020c). People working in occupations such as construction, agriculture and archaeology have an increased risk of exposure and disease because these jobs result in disturbance of soils where fungal spores may be found (CDPH, 2013).

2.3 Treatment of Valley Fever

A skin test that detects an antigen derived from a fungus of the genus Coccidioides (C. immitis) while in its mycelial (referring to filamentous hyphae) phase can be done to determine prior exposure to Valley Fever CDC, 2020d). Most symptomatic cases are self-limited and require no treatment (CDC, 2020c). The only oral treatment approved by the Food and Drug Administration (FDA) is ketoconazole while other oral azoles can be used as first-line therapy. Severe illness is treated with intravenous amphotericin B.

2.4 Valley Fever Cases

Many Valley Fever cases are very mild and approximately 60 percent people infected experience no symptoms. Because of this, most individuals infected by the fungus rarely seek medical attention. Of those who do seek medical attention, many are not diagnosed with Valley Fever which results in underreporting of the disease. Valley Fever is not contagious, and it appears that after one exposure the body will develop immunity.

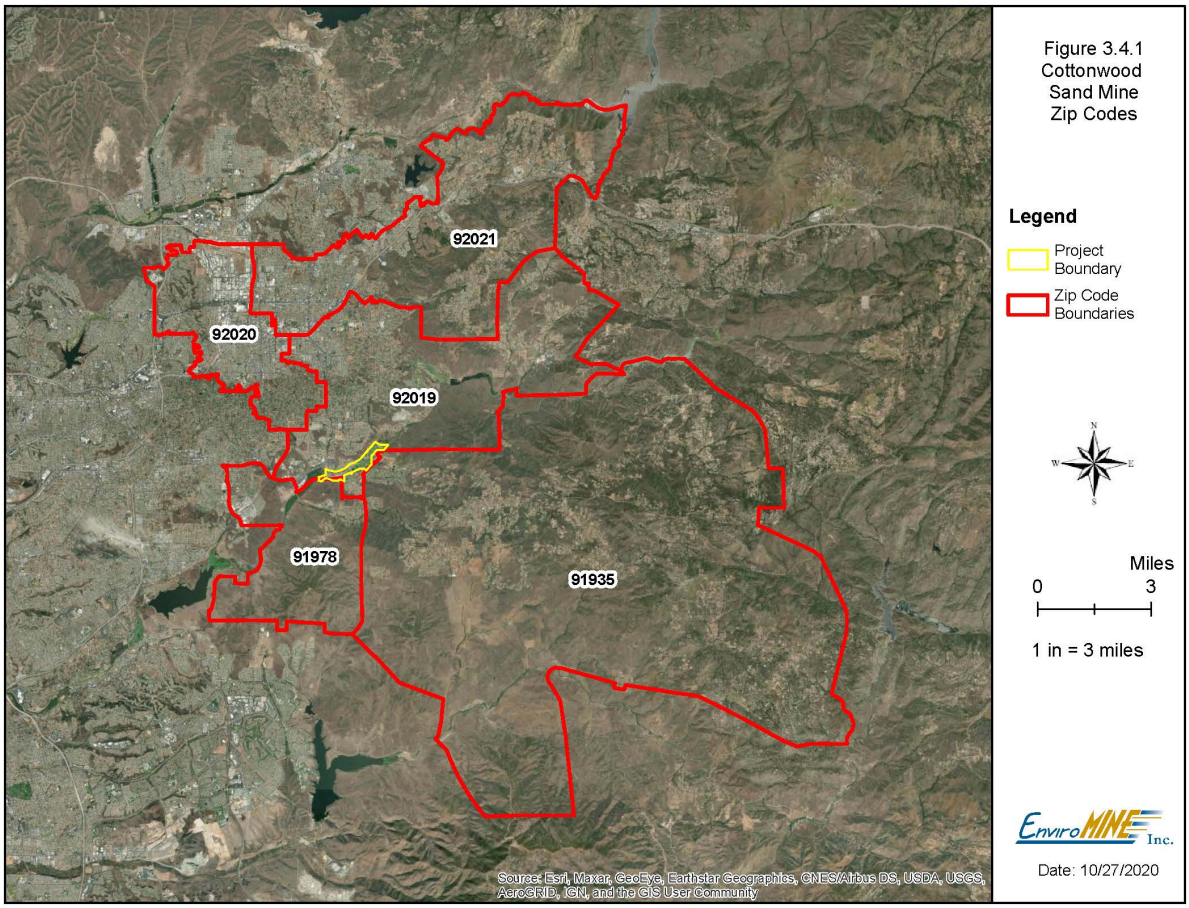
In about one percent of those infected, Coccidioides disseminates elsewhere in the body beyond the pulmonary system, which is more serious, and in rare cases can be fatal. Currently, there is no vaccine available to treat this illness, although efforts to develop a vaccine continue (University of Arizona, 2020).

Valley Fever has been reported in most counties in California with approximately 70 percent of the cases occurring within six counties including Fresno, Kern, Kings, Madera, Merced, San Luis Obispo, and Tulare Counties. The reported number of cases in California was 9,004 in 2019 or a statewide incidence rate of 23 cases per 100,000 people. This is an increase to the 2018 incidence rate of 19 cases per 100,000 people and is the highest incident rate in California since Valley Fever became individually reportable in 1995 (CDPH, 2020).

The County of San Diego, Health and Human Service Agency (HHSA), prepared case counts and rates of Valley Fever over a ten-year period between 2010 and 2019 for

residences within zip code 92019, 92020, 92021, 91935, 91978 (Figure 3.4.1)

Figure 3.4.1- Cottonwood Sand Mine Zip Codes



As shown in Table 1, over the 10-year period from 2010 through 2019 there were 21 cases reported of Valley Fever in zip code 92019, 28 cases reported in zip code 92020 33 cases reported in zip code 92021, 4 cases reported in zip code 91935 and 2 cases reported in zip code 91978. As shown in Table 1, the incidence rate of Valley Fever per 100,000 people during this time was 4.8 within zip code 92019, 4.6 in zip code 92020 and 4.9 within zip code 92021. The incidence rate of Valley Fever in these zip codes is lower than the incidence rate for all of San Diego County (6.3 per 100,000 people).

Table 1. San Diego County Valley Fever Incidence Rates 2010 - 2019

VALLEY FEVER CASE COUNTS AND INCIDENCE RATES SAN DIEGO COUNTY RESIDENTS – FROM: 2010 through 2019		
Locations	Number of Cases	Annual Incidence Rate per 100,000 population
Zip Code 92019	21	4.8
Zip Code 92020	28	4.6
Zip Code 92021	33	4.9
Zip Code 91935	4	Rate not calculated
Zip Code 91978	2	Rate not calculated
San Diego County	2052	6.3

Data Sources:
County of San Diego Communicable Disease Registry, 1/7/2021
SANDAG Population Estimates (2019 Update)

Notes:

1. *Cases are grouped into CDC disease years based on the earliest of onset date, diagnosis date, specimen collection date, death date, and date received. Onset date is unavailable in over 50% of cases.*
2. *Case counts are 10-year aggregates due to small numbers per individual year.*
3. *Includes both acute and chronic cases.*
4. *Location is location of residence when the case was reported to the County of San Diego Health and Human Services Agency, which may not be location of exposure.*
5. *Reports where a state or federal detention facility is indicated as the address of residence are excluded from the calculation of rates by zip code but, are included in the overall county count. There are also cases with a missing/unknown zip code (e.g., homeless).*
6. *Rates are average annual rates of newly reported cases. Rates based on small case counts may vary considerably and should be interpreted with caution.*
7. *A revision to the surveillance case definition for Coccidioidomycosis was adopted by California in June 2007; a single positive IgG result (in place of a rising IgG titer) became sufficient to meet laboratory criteria. National case definition changes occurred in 2008 and 2011.*
8. *Data are subject to change as cases are reviewed or new information becomes available.*

3.0 Existing Conditions

3.1 Existing Setting

The proposed project is located within the County's Valle de Oro Community Plan area. Rancho San Diego is located to the west of the project site. An approximately 32-acre portion of the project site is located within the Rancho San Diego Specific Plan area. Jamacha is located to the east of the project site.

Since 1963, the property has been used as two public golf courses. Facilities at the golf club consist of a large parking lot, a clubhouse, practice facilities and two 18-hole championship length golf courses of which one course, Lakes, was closed in the summer of 2017. Limited sand extraction occurred on the property from the early 1950s into the 1970s and continued at the site until recently for the development of new water hazards and modification of fairways. Presently, operations at the site utilize an average of approximately 797-acre feet of water annually for primarily irrigation. This water is obtained from a series of onsite water wells.

The onsite soils that will be disturbed from mining activities include Tujunga sand, Visalia sandy loam, and Riverwash. These soils are not alkaline, sandy rather than silty (gravelly in the case of Riverwash), excessively drained (low water holding capacity), very low in salinity, and well aerated (https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx - accessed 6/14/2021).

Surrounding land uses include residential, rural residential, extractive operations to the east and an adjacent golf course. Open space is present in the hills to the south, east and west of the project site. A National Wildlife Refuge abuts the western end of the property along the Sweetwater River.

4.0 Potential for Exposure

There is currently no established significance threshold for the potential exposure of workers, nearby residents, or visitors to Coccidioides spores. Onsite mining and plant operations would require the use of off-road equipment to excavate soil/material which could result in fugitive dust emissions.

As indicated, the project area is currently used by the public for golfing activities. Furthermore, the site is fertilized, irrigated (Ivanhoe course) and managed throughout the year. In addition, fertilizers and pesticides, including fungicides, are used to maintain the turf conditions at the still-operating Ivanhoe course. The practices of irrigation, fertilization and the application of fungicides to control fungi make the soil disturbed in nature. Most of the soil factors and the disturbance of the site from golfing activities do not favor the occurrence of the Coccidioides fungus as discussed in Section 3.0 of this document.

It is not currently feasible to test soil material on the site for presence of the Coccidioides fungus due to the unreliability of current test procedures or to test all potential future workers, residents or visitors for previous exposure to the fungus. The on-site soil conditions and previous and current onsite activities related to the golf course do not favor the occurrence of the Coccidioides fungus. Therefore, the potential for the project activities to increase the exposure of workers, nearby residents, and visitors to the spores of this fungus is regarded as unlikely.

5.0 Measures to Reduce Potential Exposure

Although the risk of exposure to the spores of the Coccidioides fungus is regarded as unlikely, onsite employees would be more at risk if the fungus is present, due to their

proximity to the source of fugitive dust. To reduce this risk, the following project design feature would be implemented to reduce potential exposure to fugitive dust (and therefore Coccidioides spores) by onsite workers, nearby residents, and the general public.

- Measure 1: Implement a Fugitive Dust Control Plan to reduce to the maximum extent possible airborne emissions of fugitive dust and thus spores of the Coccidioides fungus, if present. The Fugitive Dust Control Plan must be approved by the Air Pollution Control District. A draft plan is available as Appendix A of the Air Quality Technical Report (Appendix I of the Draft EIR).

- Measure 2: The employer/operator shall provide training to all employees on potential risks associated with site work regarding Coccidioidomycosis. As part of that training each employee shall be provided the fact sheet entitled "Preventing Work-Related Coccidioidomycosis (Valley Fever)" by the California Department of Public Health (https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/OHB/HESIS/CDPH%20Document%20Library/CocciFact.pdf).

6.0 Conclusion

The project site is in San Diego County which is a suspected endemic region for Coccidioides spores and has climatic conditions suitable for hosting the fungus. Considering the soil properties of the soils that will be disturbed from mining activities and that the property has been used as a public golf course and subjected to irrigation and the application of pesticides, it is unlikely that the fungus is present at the project site, if it was ever present. However, the activities of the proposed project could produce dust and if spores of the fungus were present, these activities could increase potential exposure to onsite workers, nearby residents and visitors. Since the risk of potential exposure cannot be eliminated entirely, the project will be conditioned to implement measures above to reduce fugitive dust emissions and provide information and training for onsite workers involved with grading and excavation of the top 30 cm (12 inches) of topsoil to further reduce any potential risk.

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