

**RECLAMATION PLAN
LEBATA BIG ROCK CREEK
AGGREGATE SURFACE MINE AND PROCESSING FACILITIES**

AUGUST 2014

ATTACHMENT G

**Memorandum from Mari Quillman to Lou Merzario, dated August 21,
2014, Re: *Comments Regarding the Establishment of Creosote Bush
Scrub on Revegetation Sites***

Memorandum

To: Mr. Lou Merzario, SESPE Consulting Inc.
CC: Mr. John Hecht, SESPE Consulting Inc.
From: Ms. Mari Quillman, ECORP Consulting, Inc.
Date: 8/22/2014
Re: Comments Regarding the Establishment of Creosote Bush Scrub on
Revegetation Sites

The purpose of this memorandum is to provide comments in response to a comment by the California Department of Fish and Wildlife (CDFW) on the proposed revegetation program for the Leбата Inc. Big Rock Creek Mine. I have read through the article referenced in the following comment:

Because stockpiled topsoil containing existing creosote bush seed is the proposed seed source for creosote bush restoration on the Project site, it may take decades to restore the Project site to the approved success criteria for cover density. Concepts described within the following reference may be useful for further consideration and implementation into the restoration plan: *"Effects of Pipeline Construction on Creosote Bush Scrub Vegetation of the Mojave Desert"* Article Stable
[URL: http://www.jstor.org/stable/41423976](http://www.jstor.org/stable/41423976)

I believe that the article has some valid points about the ages of creosote bush and the cloning of this species. However, I don't believe it is directly applicable to the restoration plan at the Leбата Big Rock Creek Mine for a number of reasons.

The article states that the pipeline was constructed in 1960 but it does not indicate if native topsoil was spread over the disturbed areas following construction and prior to the revegetation effort, if creosote bush seed was included in the seed mix or how the seed mix was applied, if mulch or fiber matrix was included in the seed application to hold the seed in place after the application, or if mycorrhizae was included in the seed application. All of these variables could have a significant impact on the success of the revegetation effort. A lot has been learned about revegetation techniques in the 54 years since the pipeline was constructed and revegetated. The success of revegetation projects has greatly improved with the techniques that have been developed over the years.

In order to show that creosote bush can successfully be grown as part of revegetation projects, I provide the following discussion about two of ECORP's projects. Undoubtedly, there are many more revegetation projects that have also successfully reestablished creosote bush.

Project 1 – Revegetation Project at Vulcan Materials Company's Big Rock Creek Mine near Pearblossom in San Bernardino County, California

[Martha Blane & Associates, 2002. *Vulcan Big Rock Creek Annual Revegetation Monitoring Report*. Prepared for Vulcan Materials Company. September 28, 2002.]

In 1996, a 26 acres revegetation project was implemented at Vulcan Materials Company's Big Rock Creek Mine near Pearblossom in Los Angeles County, California. Creosote bush seed was included in the two seed mixes that were applied on the revegetation area and the application method was seed imprinting. These two mixes included a desert wash mix and a creosote bush scrub mix. Creosote bush scrub was noted on the revegetation area beginning in 1997, which indicated it germinated either from the seed mix or the topsoil that was applied on the site. In 2000 and 2002, quantitative monitoring was conducted on the revegetation site. The average shrub cover determined during baseline vegetation transects for the creosote bush scrub community was 23% and for the desert wash community was 18%. Total shrub cover was considered the most important characteristic for determining revegetation success rather than individual shrub species cover. The performance standards for cover of creosote bush scrub and desert wash were 12% and 10%, respectively. The results of the 2002 quantitative monitoring determined that the creosote bush scrub had achieved a total shrub cover ranging from 19.3 to 25.3% for the various transects, thus satisfying the performance standard. Similarly, the desert wash community also satisfied the total shrub cover performance standard with values ranging from 19.4 to 44.1% for the various transects. The results of the 2002 quantitative monitoring indicated that the creosote bush scrub community had exceeded the performance standard for shrub cover by 95% and the desert wash community had exceeded the performance standard for shrub cover by 165%.

Project 2 – Revegetation of the Phase I Area at the Morning Star Mine in the Mojave National Preserve, San Bernardino County, California

[ECORP Consulting, Inc. 2012. *2012 (Third Year) Revegetation Monitoring Report for the Phase I Restoration Area at the Morning Star Mine, Mojave National Preserve, San Bernardino County, California*. Prepared for Brittan Industries, Inc. September 2012.]

In December 2008 and January 2009, a revegetation project was implemented at the Morning Star Mine in the Mojave National Preserve, San Bernardino, California. Topsoil containing creosote bush seeds was spread over a portion of the revegetation site prior to hydroseeding. Creosote bush (*Larrea tridentata*) was also included in the seed mix as were 12 other native species of desert plants. The application rate for the creosote bush seed was 1.25 pounds per acre and the application method was hydroseeding. During the as-

built site visit in July of 2009, creosote bush was noted as present in the revegetation area. It was also noted during the annual monitoring visits in 2010, 2011, and 2012. Qualitative monitoring at the site did not continue after 2012 and quantitative monitoring was never conducted because the prime contractor (Brittan Industries, Inc.) declared bankruptcy and the contract was terminated by the National Park Service.

A site visit was conducted at the revegetation site on August 21, 2014 to look at the progress and to qualitatively reevaluate the status of Joshua Trees and creosote bush. The Joshua trees continue to survive and many have flowered and produced seed during the 2014 season. In addition, recruitment of Joshua Tree “pups” was also noted. The creosote bush seed that was included in the seed mix germinated very well and new plants continue to germinate. The plants ranged from a few inches to approximately three feet tall. Creosote bush was a common species throughout much of the revegetation site. Photograph 1 shows a broad view of a portion of the revegetation site and the dark green plants in the photograph are the creosote bushes. Photograph 2 shows a closer view of one of the creosote bushes on the revegetation site with a cellphone at the base to demonstrate the size of the shrub. The revegetation site was seeded in December 2008 and January 2009, which was about 5.5 years ago. The growth and density of the creosote bush shrubs in approximately five years shows that creosote bush can be successfully grown on revegetation sites.



Photograph 1 – Overview of the Phase I revegetation site at the Morning Star Mine



Photograph 2 – Creosote bush shrub on the Phase I Revegetation Area

In conclusion, the referenced article, *"Effects of Pipeline Construction on Creosote Bush Scrub Vegetation of the Mojave Desert,"* is not applicable to the revegetation project for the Lebata Big Rock Creek Mine because revegetation techniques have greatly improved since 1960 when the pipeline was revegetated. Current revegetation projects show that creosote bush can be successfully grown when seeds are included in topsoil and are included in the seed mix.