

WALK-THRU SURVEY REPORT  
OF  
MOLYCORP'S  
MOUNTAIN PASS OPERATION  
AT  
MOUNTAIN PASS, CALIFORNIA

Survey Conducted By:  
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Report Written By:  
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Date of Report:  
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PURPOSE OF SURVEY: To perform a preliminary survey of the rare earths bagging operations at the Mountain Pass Operation of Molycorp.

COMPANY ADDRESS: Molycorp, Inc.  
Mountain Pass Operation  
Mountain Pass, California 92366

EMPLOYER REPRESENTATIVES CONTACTED: Albert S. Johnson, Safety Engineer  
Keith Elliott, Environmental Engineer

EMPLOYEE REPRESENTATIVES CONTACTED: Gary Henize, Safety Committee  
United Steel Workers Local 7307

STANDARD INDUSTRIAL CLASSIFICATION CODE: SIC 2819

ANALYTICAL WORK: None

## ABSTRACT

A preliminary survey was conducted at Molycorp's rare earth operation at Mountain Pass, California, in conjunction with a NIOSH study evaluating measures used to control occupational health hazards associated with the packaging processes used for dry chemicals. A large number of workers in a variety of industries are involved in the packaging process. The company, although able to meet MSHA standards, is not considered to have exemplary controls and is not recommended for an in-depth study.

## I. INTRODUCTION

The Engineering Control Technology Branch of the Division of Physical Sciences and Engineering, NIOSH, is conducting a research study to assess and document the exemplary technology available for the control of airborne dust in dry chemical bagging and filling operations. The control technology studies will be described in sufficient detail to allow the information to be used to prevent or reduce the generation and transmission of the dust in similar industrial operations. The results of the assessment will be disseminated in a manner that will maximize the application of demonstrated control technologies in the workplace.

A survey of the packaging (bagging) operation was conducted to determine the suitability of this plant for an in-depth study. Engineering control technology observed included; ventilation systems, work practices, and protective equipment. Molycorp had some controls worth noting. However, due to the adverse effects of the weather (frequent winds), the openness of some of the packaging operations to the out-of-doors, and other factors, this operation is not considered for an in-depth study.

## II. Plant Description

Molycorp's (subsidiary of Union 76 Oil) Mountain Pass operation is the world's largest rare earths mine, producing bastnasite (a conglomerate of rare earth minerals) and rare earth salts. The operation is located at Mountain Pass, California, a small community (less than 500) located 60 miles west of Las Vegas, Nevada. It is an open pit mine and mill complex consisting of several buildings, five of which house the company's five packaging operations for bags, barrels, and semi-bulk bags (sling bins).

There are two bag filling stations, bastnasite and cerium. The bastnasite station can be used to fill both bags and barrels and is located in a steel frame, metal sided, one floor structure having approximately 6400 feet of floor space. The cerium station, for bags only, is located in a steel frame, metal sided, 30-foot-tall structure with approximately 1600 square feet of floor space. The remaining packaging stations are for barrels and/or sling-bins.

There are two lanthanum packaging stations for both barrels and sling-bins. One is housed in a one story, wood frame, plywood side structure approximately 15 feet by 30 feet. The second station is in a 25 foot wood frame and corrugated fiberglass structure nearly 20 feet high. The last packaging station fills 5 gallon cans with samarium and gadolinium. It is located in the newest building, a 30 foot high concrete walled structure with approximately 30,000 square feet of floor space. All five buildings have concrete floors and no basements.

### III. PROCESS DESCRIPTION

This union plant, in operation since 1953, operates 24 hours a day, 5 days a week with 180 employees annually processing approximately 30,000 tons of ore. Ninety-nine percent of the finished product (bastnasite, cerium, lanthanum, and other rare earth salts) is shipped in containers (bags, barrels, and sling-bins); (60%) by rail, (39%) by truck, and 1% is shipped in bulk.

The ore is trucked a quarter mile from the open pit mine to the plant, comminuted, and beneficiated in a high acid leach and flotation process to yield bastnasite concentrate. One third of this bastnasite is dried, packaged, and shipped. The remainder is reprocessed to yield various rare earth salts to be dried, packaged, and shipped.

There are two-force flow, single spout bag packers used to fill multi-ply valve-type bags with 100 pounds of product. The packer for bastnasite is a St. Regis model 770 FF and for cerium, a St. Regis model 14-UC-1. At both packers, the bags are manually placed on the packer spout to be filled. For bastnasite, the filled bag is automatically ejected onto a metal plate, slides onto a conveyor belt, conveyed 10 to 12 feet, and manually palletized. For cerium, the filled bag is manually removed from the packer and manually palletized. Forklifts are used to move the loaded pallets. The packer for bastnasite has been modified by using a 2-inch flexible hose to fill 55 gallon drums.

The packers for lanthanum are gravity flow spouts under which the drum or sling-bin is positioned. The operator manually positions the drums, along a roller conveyor, under the spout. A hand scoop is used to adjust the final container weights before either placing the lid on the drum or tying the sling-bin shut.

The packers for samarium and gadolinium is a low volume, manual packer. These rare earth salts are processed in the same building housing the two similar packers. Each 5 gallon can charge is poured through the top of the packer unit. The product flows through the packer into the container which is then capped by the operator.

#### IV. DESCRIPTION OF SAMPLING AND TRAINING PROGRAMS

Dr. Rainer Beck, Corporate Industrial Hygienist for Union Oil, has done a majority of the sampling, both total and respirable dust, for the past three years. Presently, Dr. Beck is training Mountain Pass's Environmental Engineer to do the necessary sampling.

All employees are required to have pre-employment physicals. The company follows MSHA's safety training and refresher training programs. Personal protective equipment required on the job is respirators, in certain areas, hard hats, safety glasses, and safety shoes. Housekeeping in the packaging areas is accomplished mainly by dry sweeping.

#### V. SAMPLE DATA FROM PRELIMINARY PLANT SURVEY

No samples were taken.

#### VI. DESCRIPTION OF CONTROL STRATEGY FOR THE BAGGING OPERATIONS

In the general environment, one of the main concerns is the free silica in the fugitive airborne dust. Orzan (a petroleum product) mixed with water is sprayed on the dirt haulroads as a dust control. This mixture leaves the road with an oil-like surface.

At both bag packing stations, exhaust ventilation and screw conveyors are used to reduce dust emissions. At the bastnasite packer, the ventilation system consists of an L-shaped, 6-inch-square duct with 2-inch-diameter holes on 10-inch-centers located in a plane level with the packer bag saddle (Figure 1). Also, there are two 8-inch-square ducts located above and behind the bag saddle. Beneath the bag packer is a screw conveyor to remove product spilled from the packer spout, bag valve, and broken bags. An 8-inch flex hose provides exhaust from the top of the barrels when they are being filled.

At the cerium packer, an engineered ventilation system, including hood and screw conveyor, is in place (Figure 2). This hood sets on a four foot high platform with the screw conveyor located beneath the packer. The platform floor, common with the top of the screw conveyor hopper, is a metal grid with the remaining floor being solid metal. Inside the hood, the bottom of the hood is open to allow spilled product to drop into the screw conveyor hopper. Exhaust ventilation ports (4) are located along the sides of the hood in the packer area and one from the screw conveyor hopper. (The company says this hood is not very effective in capturing airborne dust)

A 12-inch flexible hose, positioned near the mouth of the drum or sling-bin being filled, is used to capture the airborne dust at the lanthanum packaging stations. For the samarium and gadolinium packer station, an exhaust hood is located above the open top packer.

## VII. CONCLUSIONS AND RECOMMENDATIONS

The company is making advances in improving the engineering control to reduce airborne dust at their packaging stations. However, the effectiveness of the present controls would not warrant an in-depth study.

The bastnasite packaging operation was not in operation during our site visit. However, the amount of dust lying on the slide plate, on the exhaust duct, and elsewhere, indicates this ventilation system is not as effective as it could be. The cerium packaging station was in operation and the hood appeared ineffective in capturing most of the airborne dust. Dust control at the lanthanum packer stations is a problem, especially when the wind blows. The cerium and lanthanum packaging operations are located in drafty areas being highly susceptible to these winds, making effective dust control very difficult.

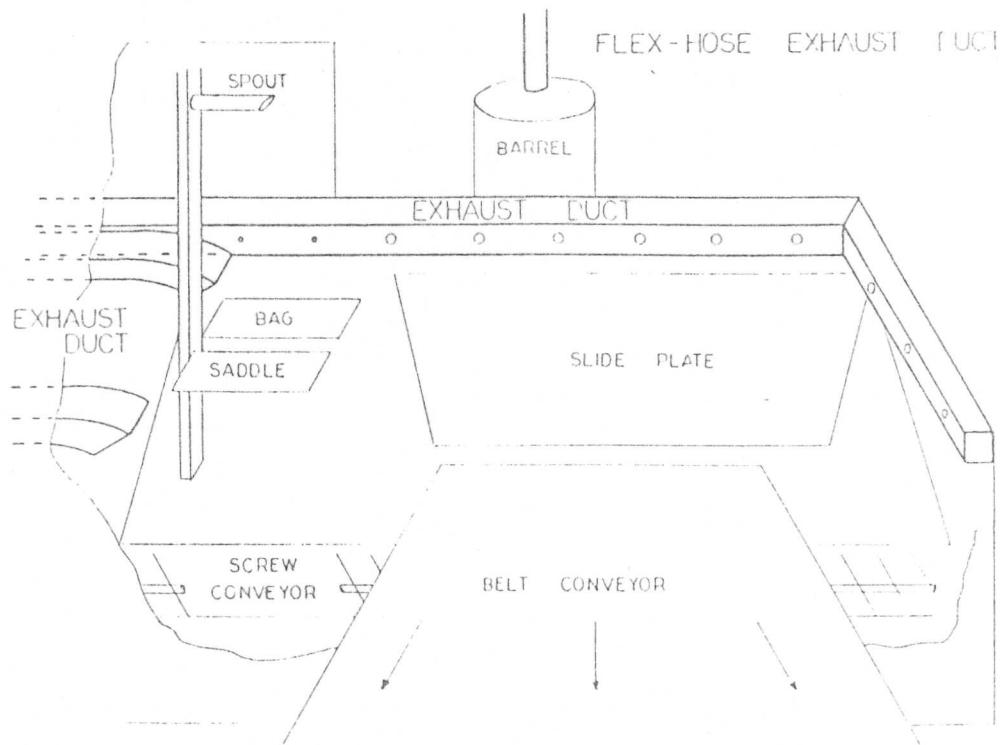


Figure 1- BASTNASITE PACKING STATION

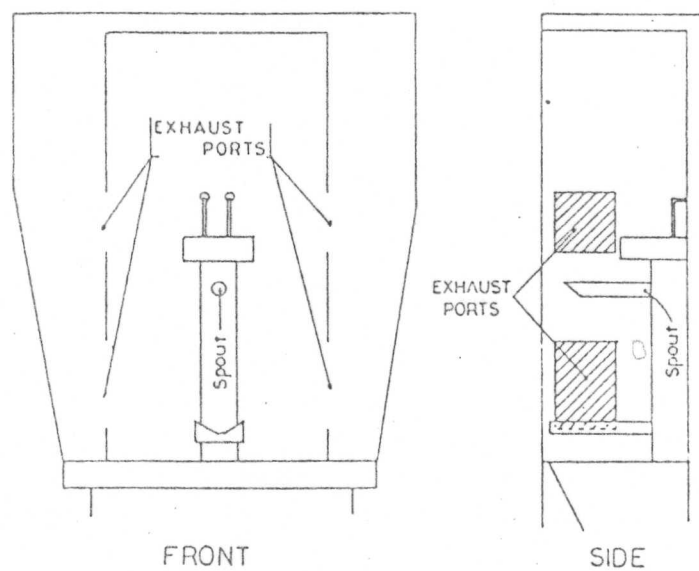


Figure 2- CERIUM PACKER HOOD