CASE HISTORY

Long Term Lay-up

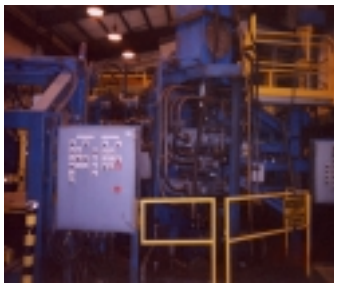
Optimum Long Term lay-up Program at a BHP Copper Mine

DATE
1999

CUSTOMER
BHP Copper Mine

LOCATION
San Manuel, Arizona

PRODUCTS
VCI-307, VCI-101, VCI-105, VCI-111, VCI-326, VCI-329, VCI-369 and VCI-705



BACKGROUND
The BHP copper mine is the world's largest underground copper mine. It produced 282 million pounds of copper in 1995. Due to economic conditions in the copper mining industry, BHP made a strategic decision to close down their San Manuel facility. The company wanted to protect the mine operation equipment from corrosion, in case the mine would need to be reopened.

Equipment to be protected included: a 62,000 ton per day concentrator, a heap leach, an in-situ leach, a SX-EW plant, a 1,300,000 ton smelter, a 3,000 ton per day acid plant, a 345,000 ton per year electrolytic refinery and a 180,000 ton per year rod plant. In addition, various smaller equipment was also included.

PROBLEM
The customer needed help to shut down the mine and protect the equipment. Their requirements included the large mining equipment the plant used on a daily basis. BHP was especially concerned about corrosion that would inevitably occur on idle equipment. They needed a supplier that could provide a "One Stop" solution for the protection of their various equipment and systems. Protection was also needed for cooling tower, boiler systems, pumps, compressors, locomotive engines, electrical/electronic systems, gear boxes, manual transmissions, differentials & transfer cases, bearings and bushings.

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Continued:

The shutdown and layup program had to provide:

a. Protection for up to two years
b. Ability to restart with minimal effort
c. Environmentally sound products
d. Technical support and service during the life of the project

Cortec Corporation designed a Total Corrosion Control™ program for the BHP mine. Cortec's solution addressed all of BHP's needs. The VCI products would protect for up to two years, require no removal before start-up and incorporate Cortec's biodegradable, non-toxic and non-hazardous products.

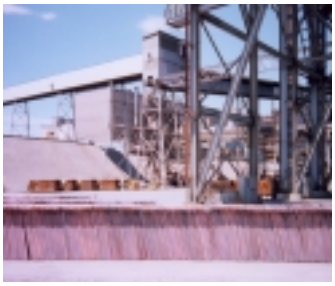
The following is a description of each of the products in the system and how they were used.

SOLUTION-AND-APPLICATION

1. **Cortec® VCI-307**
This corrosion inhibiting powder was blown, sprinkled and fogged into boilers, compressors, exhaust systems, etc.
Typical Dosage: 0.3 oz (8.4 grams) per one cubic foot (300 g/m3)

2. **Cortec® Emitters VCI-101, VCI-105 and VCI-111**
Cortec® emitters were applied to non-ventilated and enclosed spaces such as control boxes, tool boxes or cabinets.
Typical Dosage: One 101 emitter per one cubic foot of space, One 105 emitter per five cubic feet of space, One 111 emitter per eleven cubic feet of space.

3. **Cortec® VCI-329 Oil Additive**
VCI-329 corrosion-inhibiting oil additive was added into engine oil and automatic transmissions.
Typical Dosage: 10% by volume.



4. **Cortec® VCI-369**
VCI-369 was used as an oil additive/temporary coating. It was applied to gearboxes, manual transmissions, differentials and transfer cases. It was also used to protect hydraulic and air cylinder shafts and other "bright steel" in a covered condition.

5. **Cortec® VCI-369 CorrLube™ Grease**
This VCI grease was used as a chassis grease for all types of bearings and bushings.

6. **Cortec® VCI-705 Fuel Additive**
VCI-705 additive was added to gasoline, diesel, gasohol mixtures and alcohol fuels as a corrosion inhibitor fuel stabilizer and water emulsifier.
Typical Dosage: 0.75 fl. oz. Per 5 U.S. gallons (112 ml/100 liters)

CONCLUSION

Cortec Total Corrosion Control™ solution will protect mine equipment from corrosion for a minimum of two years. The immediate projected Return on Investment is 122.5%. Cortec Corporation's VCI products and lay-up expertise will protect approximately $25 million of potential loss, making it a small investment.

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