

2.10 Transportation

The Rosemont Copper Project is located about 30 mi southeast of Tucson along SR 83. Access to the site is from I-10 between Tucson and Benson at the intersection with SR 83 (Exit 281) and then south on SR 83 about 12 mi to the plant access road. There is no rail service into the plant and all materials arriving and leaving the plant will be transported by truck. East-west rail service is available at Benson, about 30 mi to the east, and north-south rail service is available at Sahuarita, about 35 mi to the west. Major equipment is also anticipated to arrive via the Port of Tucson near Vail, Arizona (see Section 2.12.2). Although a west access road is provided from the plant over the Santa Rita Mountain ridge to Sahuarita, all deliveries to the plant will enter the site from the access road at SR 83.

Table 6 shows the major products and consumables that will be shipped to and from the plant, along with the expected quantities and number of trips. A trip is a round trip for one truck entering the plant to pick up or leave a load and leaving the plant empty or with the load. The most sensitive times of the day are considered to be around shift change and early weekday mornings and afternoons during school bus hours on SR 83. Van pools for employees and staggered work shifts will be used to reduce the number of trips during these times of the day.

2.10.1 Copper and Molybdenum Concentrates

Shipments of copper concentrates will represent the highest volume of traffic from the plant, with the exception of employees arriving and departing at shift change. Copper concentrates will be transported by highway tractor trailer rigs to local smelters in Arizona or to rail sidings for shipment to the west coast for export. The tractor-trailer have a capacity of 24 T and will be covered by tarp to prevent losses while in route. At an annual production of about 484,700 T, approximately 388 trips per week will be required or about 56 trips per day, 7 days per week. The plant can load about four concentrate trucks per hour which will require 14 hours per day to load and ship the concentrates. The shipments will be scheduled to avoid the high traffic hours on SR 83 during early mornings, afternoons, and at shift change.

Table 6. Trip Data

Material	Quantity per Year	Trips/Week	Trips/Day	Trips/Hour
Copper Concentrate, tons	484,700	388	56	4
Sulfuric Acid, tons	73,190	64	9	3
Pebble Lime, tons	37,200	33	5	2
SAG & Ball Mill Balls, tons	19,000	17	4	2
Diesel Fuel, gallons	9,000,000	29	4	2
Copper Cathode, tons	19,000	17	4	2
Ammonium Nitrate, tons	20,075	18	4	1
Miscellaneous Reagents, tons	3,750	6	1	1
Wear Parts & Explosives, tons	3,250	5	1	1
Moly Concentrates, tons	4,670	4		
Fuels & Oils, gallons	105,000	1		

The facility is estimated to produce about 4,670 tpy of moly concentrates as a by-product of the copper concentrates. Moly concentrates will be shipped in bags at the rate of about one truck per day, four days per week.

2.10.2 Sulfuric Acid

Sulfuric acid is a reagent used in the leaching operation; it will be received in special acid tank trucks with a capacity of about 22 to 24 T. Sulfuric acid is available regionally from two smelters in Arizona and one in Northern Mexico. At an annual requirement of about 73,190 T, approximately 64 trips will be required per week, or about 9 trips per day. Note that acid requirements will be reduced significantly after Year 6. Acid receipts will be scheduled seven days per week and during a day shift. The plant can receive and unload about three acid trucks per hour, which will require about three hours per day for sulfuric acid. Acid receipts will be scheduled to avoid high traffic hours and shift changes for safety.

2.10.3 Pebble Lime

Pebble lime is a reagent used for pH control in the grinding and flotation process. Pebble lime will arrive from local sources in bulk in bottom-discharge tank trucks with a capacity of 22 to 24 T. The pebble lime will be pneumatically conveyed from the truck to a storage silo. At an annual requirement of about 37,200 T, approximately 33 trips will be required per week, or about five trips per day. The plant will receive and unload about two trucks of lime per hour, which will require about 3 hours per day. Pebble lime receipts will be scheduled seven days per week during the day and evening, and will avoid high traffic times on SR 83 and shift changes.

2.10.4 SAG and Ball Mill Grinding Balls

SAG and ball mill grinding balls are a major consumable for the grinding circuit. Grinding balls are available from local sources in Arizona and are received in bulk by bottom dump or end dump trucks with a capacity of 24 T. At an annual requirement of about 19,000 T, approximately 17 trips per week, or 4 trips per day, will be required. The receipt of grinding balls will be scheduled during the day, five days per week. The plant can receive and unload about two trucks of grinding medium per hour, which will require about two hours per day for the receipts. Two trucks can be received mid-morning and again mid-afternoon to avoid shift changes and high commute periods on SR 83.

2.10.5 Diesel Fuel

Diesel fuel is a major consumable for the haul trucks. Diesel fuel is available from local suppliers and will be received in tank trucks with a capacity of about 6,000 gallons. At a peak capacity of about 9 million gpy, approximately 29 trips per week, or four trips per day, will be required to receive the fuel. Diesel receipts will be scheduled seven days per week during the day between shift changes. The plant will receive and unload about two trucks per hour, which will require about two hours per day for receiving the diesel into storage.

2.10.6 Copper Cathodes

Copper cathode will be produced from the oxide ore in the SX/EW plant. Peak copper cathode production will occur in Year 2 at about 54 tpd; however, this production rate falls to about 10 tpd in Year 5. Based on the peak production year, approximately 19,000 T of cathodes will be produced, which will require about 17 trips per week or 4 trips per day. The copper cathodes will be loaded onto flat-bed trailers with capacities of 22 to 24 T. Approximately two trucks will be loaded and shipped per hour, which will require two hours of shipping per day. Cathode shipments will be scheduled five days per week during the day.

2.10.7 Ammonium Nitrate

Ammonium nitrate will be used for blasting in the pit. It will be received from local sources in bulk by tank truck and pneumatically conveyed into storage silos near the mine. The truck capacity is about 22 to 24 T. The consumption of ammonium nitrate will be about 20,075 T per year, which will require about 18 trips per week, or four trips per day, based on receipts five days per week. Each truck of ammonium nitrate will be received and unloaded into storage in about one hour, for approximately four hours per day.

2.10.8 Miscellaneous Consumables

Miscellaneous quantifiable consumables will consist of reagents used in the process and wear parts used in the crushing and grinding line. Also included will be explosive powder and caps used by the mine. Reagents used in the flotation circuit will be Aero 242 collector, xanthates (SIPX), frother (MIBC), flocculants, sodium hydrosulfide, sodium silicate, burner oil, Dowfroth, and polyglycol. Reagents used in the SX/EW circuit will be LIX extractant, diluent, diatomaceous earth, clay filter media, FC-1100 mist control, guar and cobalt sulfate. Wear parts used in the crusher and grinding line will include primary crusher liners, SAG and ball mill liners, pebble crusher liners, and regrind mill liners.

The total amount of reagents that will be used for the flotation plant and SX/EW facility is estimated to be 7.5 million lbs per year (3,700 T). The quantity of crusher and grinding wear parts that will be used is approximately 4.1 million lbs per year (2,050 T). The total quantity of explosives powder and caps used is estimated at 1,200 T per year. Total miscellaneous reagents and consumables that can be quantified will total about 7,000 T per year or about 135 T per week. All miscellaneous reagents and consumables will be shipped to the plant site by small (10- to 15-T) trucks. This requires about 10 trips per week or two trips per day on a five-day per week basis.

Consumables such as office supplies, safety equipment, and small tools cannot be quantified, however, these consumables are not considered significant to the transportation study.

2.10.9 Miscellaneous Fuels and Lubricants

Miscellaneous fuels and lubricants will include gasoline, motor oils, lubricants, and antifreeze. Used oils and waste antifreeze will also be transported out of the plant for recycling. Consumption of all miscellaneous fuels and lubricants is estimated at 105,000 gallons per year. Fuels and lubricants will be shipped to the plant in bulk by tanker trucks of capacities of 2,000 to 6,000 gallons or in barrels. All miscellaneous fuels and lubricants will average 2,000 gallons per week or one trip per week.

2.10.10 Employees

The work force for the Rosemont Project is estimated at 494 employees. Approximately 85 will be salaried, technical, and administrative personnel and are scheduled to work five days per week on day shift only. The shift schedule will be 8:00 a.m. to 5:00 p.m., Monday through Friday. In addition, approximately 38 maintenance employees will work day shift only, Monday through Friday. Their scheduled shift will be 7:00 a.m. to 4:00 p.m. Another 371 employees will work rotating 12-hour shifts from 6:00 a.m. to 6:00 p.m. One hundred and nine workers will be on day shift, 77 on night shift, and 185 will be scheduled off at any one time. The shift-change hours will start before 6:00 a.m. with the arrival of a new shift. Maintenance employees will start arriving before 7:00 a.m. after the night shift employees have left. The administrative and technical employees will start arriving before 8:00 a.m. At the end of the day, maintenance employees will leave at 4:00 p.m., administrative and technical employees at 5:00 p.m. and the shift operators at 6:00 p.m.

For the transportation study, it is assumed that van pooling will be provided with an average of five people per car. This will result in 47 trips arriving and 15 trips leaving in the morning. At the evening shift change, 47 trips will be leaving and 15 arriving. The shift change hours will see the highest volume of traffic in and out of the plant. At times, traffic will be under 10 trips per hour.

2.10.11 Safety Evaluation

Access to the plant will be by federal and state highways up to the primary access road. The access road will be 3.7 mi long with no sharp turns or grades of more than 8%. The access road will be two-lane, 14-ft wide each, with 4-ft shoulders. Drainage will be provided on both sides of the road to control stormwater runoff. The road surface will be compacted ADOT aggregate (Class 2), 8 in thick. The road will be designed for travel at 35 mph.

The intersection of the plant access road and SR 83 will be upgraded to include turnout and acceleration/deceleration lanes on SR 83 approaching from either direction and leaving in either direction. Shift change will be staggered to spread the traffic over a three-hour period for arriving and departing traffic. Van pools will also be used to reduce the number of vehicles entering and leaving the plant at shift change. Major shipments, such as copper concentrates and sulfuric acid, will be scheduled to avoid shift changes and high volume traffic times for SR 83.

Employees arriving and departing the plant at shift change will create the highest density at 23 to 32 trips per hour. Trip densities during the balance of the day will be under 10 trips per hour, which can comfortably accommodate the miscellaneous traffic from vendors, visitors, and deliveries of common warehouse items.

2.11 Waste Management

2.11.1 On-Site Management of Wastes

Rosemont Copper will manage materials on site to minimize the amount of waste created and to ensure wastes do not become mixed, contaminated, or otherwise mismanaged. A summary of these measures is provided below. Additional information is provided by Tetra Tech (2007i).

2.11.1.1 Solid Waste

As part of the on-site permitting effort, Rosemont Copper will file for a solid waste facility permit and include the facility in the area-wide permitting effort allowed by ARS §49-243.P. The facility is planned to cover approximately 1.5 ac and will be managed using trenching and cover techniques.

The facility will be managed for on-site, non-hazardous wastes, and will not accept any off-site wastes. The primary disposal activities on site will include but may not be limited to the following:

- Demolition and construction debris
- Non-putrescible materials
- Waste from maintenance and operations meeting the definition of inert or non-hazardous such as respirator filters, gloves, boxes, non-recyclable packaging material, air filters, hoses, and piping

This permit must meet the requirements of a non-municipal solid waste facility.

2.11.1.2 Hazardous Waste

Hazardous wastes that may be generated at the facility include, but may not be limited to, the following:

- Waste paint materials such as thinners
- Chemical wastes such as acetone from the on-site laboratory
- Residue wastes from containers or cans

As part of the permitting effort, Rosemont Copper will file for a hazardous waste identification number from the EPA and register as a generator of hazardous waste with ADEQ and PCDEQ. Proper management of wastes should allow Rosemont Copper to have a status of Conditionally Exempt Small Quantity Generator (CESQG) of hazardous wastes. However, in the event that it becomes necessary to

manage quantities of waste in excess of the CESQG threshold, Rosemont Copper will be in compliance by following all rules associated with proper management of waste on a larger scale.

Waste will be stored on site and inspected as required by the hazardous waste regulations.

As part of these pollution prevention activities, Rosemont Copper materials entering the site will be examined to determine if they have the potential to create hazardous waste. If they do, non-hazardous substitutes will be sought. The operations will be examined on an on-going basis to ensure that hazardous substances are eliminated whenever possible.

2.11.1.3 Sanitary Waste

Sanitary waste at the Project will be handled by septic systems, with leach fields located in the vicinity of each building. During the construction phase, and where necessary during operations, portable toilets will be used in various locations throughout the plant and mine sites. Sanitary wastes will be collected periodically by a commercial sanitation service and removed for disposal off site.

2.11.1.4 Specific Waste Management Activities

In general, waste will be managed in dumpsters or other appropriate containers. All containers will be covered or weighted to prevent blowing trash. Trash from office areas will be bagged. A waste disposal company will be contracted as necessary to manage wastes other than debris or construction and demolition wastes.

2.11.1.4.1 Scrap Metal

Scrap metal will be managed to facilitate recycling, with separate roll-off dumpsters located near points of use. Contracts with scrap metal recyclers will be established for on-going recycling activities. In the event recycling becomes impossible or otherwise impracticable (i.e., scrap prices drop or scrap prices become so high there are not enough recyclers), scrap metal will be stockpiled near the solid waste facility for bulk recycling.

2.11.1.4.2 White Paper

The Department of Economic Security (DES) provides a recycling service for white paper. Unfortunately, the pick-up service DES offers is confined to the Tucson area. At this point, Rosemont Copper plans to drop off white paper waste at the DES offices on an as-needed basis to minimize the amount of paper disposed on site. Rosemont Copper will continue to investigate additional opportunities for white paper management.

2.11.1.4.3 Grease

Grease associated with the hoisting, milling, and other operational equipment will be placed into drums or other bulk containers suitable for recycling. If the grease is not suitable for recycling, the contained waste

will be sent off site for disposal. While on site, the containers will be managed in an area that will provide secondary containment.

2.11.1.4.4 Used Oil

Used oil from maintenance activities will be managed in bulk containers with secondary containment to ensure there is no release to the environment. Only oil acceptable for recycling will be placed in the bulk containers. Used oil not acceptable for recycling will be placed in drums for proper disposal.

2.11.1.4.5 Batteries

Lead acid batteries will be returned to the vendor for recycling or shipped off site to a recycler. While they are stored on site, they will be managed in an area protected from stormwater and will have secondary containment.

Nickel-Cadmium (NiCd) batteries will be stored for recycling by a local vendor. While on site, they will be managed in drums or boxes suitable for storage.

Lithium batteries will also be stored for recycling in appropriate containers.

2.11.1.4.6 Tires

There are two opportunities for disposing tires from registered vehicles and that are less than 3 ft in diameter. The vendor will remove the waste tires from the property for appropriate disposal or recycling; or, a waste handler will be contracted to remove the tires for appropriate disposal or recycling.

At mining sites, the vendors who supply the tires generally remove them for recycling or disposal. Rosemont Copper will contract with vendors or waste haulers who can appropriately manage waste tires smaller than 3 ft in diameter.

Tires that are greater than 3 ft in diameter are eligible for on site disposal (AAC Title 18 Chapter 13.) This code allows operators to bury mining waste tires in an on site cell if they meet specific requirements. Once placed in the cell, the tires will be covered with a minimum of 6 in of material within 50 days of placement. Once the cell is full, at least 3 ft of final cover will be placed over the cell within 180 days. Rosemont Copper will file the required annual reports, keep records and provide any certifications as required by the regulations.

At this time, Rosemont Copper is investigating the potential for reuse of these tires and will continue to seek contracts for beneficial uses of mining tires. As appropriate, tires may also be used for erosion control or structural fill. If alternatives to burial exist, Rosemont Copper will review them and manage the tires accordingly.

2.11.1.4.7 Lead Flake and Anodes

The electrowinning process uses lead anodes to provide the necessary electrolytic conditions for copper plating. During this process, the anodes degrade creating a lead flake that falls into the electrowinning cells. This flake and the degraded anodes are a valuable commodity when managed properly and recycled. On-site management of these materials will consist of placing the flake into a roll-off or other container designed to contain the material for transport to a lead smelter for recycling. Anodes will also be stored in containers to facilitate shipment for recycling.

2.11.1.4.8 HDPE Materials

Piping and liner materials made from HDPE may be recycled if managed appropriately on site. Rosemont Copper plans to identify a recycler of these materials and utilize them accordingly. If HDPE piping and liner grade materials are not recyclable, Rosemont Copper will dispose of these materials in the on-site waste management facility.

2.11.1.4.9 Wood and Other Packing Materials

Much of the material delivered to the Rosemont site will be on wooden pallets, packaged in cardboard, or wrapped in plastic. Many of these items will be recycled in Tucson. Rosemont Copper plans to recycle as much of the shipping and packaging material received at the site as possible, utilizing businesses in Tucson and the surrounding communities.

2.11.2 Offsite Shipment of Wastes

When off-site disposal is necessary, Rosemont Copper will manage materials as required by the Resource Conservation and Recovery Act (RCRA) and Department of Transportation (DOT) regulations. All shipments will be properly marked and manifested (using manifests or bills of lading), and characterizations of shipped waste materials will be available.

2.11.2.1 Solid Waste

Materials that may not be hazardous waste but are not appropriate for disposal on site will be shipped off site for recycling and/or disposal. Materials such as used oil and scrap metal will be shipped to recyclers that are audited either by Rosemont Copper personnel or by regulatory agencies. Other materials, such as grease that may not have available markets for recycling, may need to be disposed off site rather than recycled.

2.11.2.2 Hazardous Waste

Materials classified as hazardous waste will be shipped off site for destruction or disposal. Materials such as contaminated grease, unused chemicals, paint related materials, and reagent that may be classified as hazardous waste will be shipped off site. Rosemont Copper plans to dispose of these materials using the most permanent and practicable disposal method available.