Kennecott Utah Copper

Air Quality Information Brief
August 2010

As a stakeholder in the economic, social, and environmental future of the Salt Lake Valley, we are committed to integrating sustainable development into our business decisions.

About us
At Kennecott, sustainable development is important to our success as a producer of copper, molybdenum, gold, silver, and sulfuric acid, and to the social and financial investment we have made in our stakeholders and surrounding communities. We accept the common definition of sustainable development which is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

While sustainable development cannot be achieved by one organization on its own, we believe that our business can make an important contribution to the ongoing, global transition to sustainable development. The minerals and metals we produce contribute to society's needs, creating wealth to support community infrastructure, health care and education programs, and delivering financial dividends for our shareholders. Our activities also provide the means and opportunity to develop new approaches to solving the world's environmental and human development challenges, such as climate change and poverty.

We also recognize that, if not managed appropriately, some aspects of our activities have the ability to detract from sustainable development, such as options for the future use of water and land; amenity impacts on local communities; and greenhouse gas and other air emissions from our operations and the use of our products. As a result, we aim to balance the complex interaction of environmental, economic and social factors that are fundamental to our business success in order to achieve our goal of contributing to sustainable development.

The importance of air quality
Utah's air quality is a concern. Our mountain-and-valley topography, diverse economy, and a vastly growing population create challenges for the state in attaining air quality standards. Despite these challenges, long-term monitoring data shows that Utah's air continues to improve. (See Utah Division of Air Quality (UDAQ) for more information.) Improving the Wasatch Front's air quality is important to many stakeholders given the area's air quality attainment status and the frequency of winter inversions and summer

smog episodes. Stricter regulations for motor vehicles and stationary sources, as well as other emission reduction programs, have helped reduce smog and improved visibility.

Q: What are the main air pollutants affecting the Wasatch Front?
A: According to the Utah Department of Environmental Quality (UDEQ), several common air pollutants can create air quality problems along the Wasatch Front. These include carbon monoxide (CO), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), oxides of sulfur (SOx), and oxides of nitrogen (NOx).

Q: What is particulate matter?
A: Particulate matter (or PM) is very small dust and soot particles, and is referred to as PM_{10} and $PM_{2.5}$. PM_{10} is matter that is 10 micrometers in diameter or less, which is about one-seventh the width of a strand of human hair. $PM_{2.5}$ is even smaller, measuring 2.5 micrometers or less. PM is usually comprised of a number of components.

Soil and dust particles and certain metals emitted directly into the air are considered PM. The primary human-caused sources of PM include blowing dust from construction sites and agricultural activities, particulate emissions from automobiles and diesel engines, combustion products from coal-fired power plants, and soot from fireplaces and wood stoves. Along the Wasatch Front, deteriorated visibility during winter inversions is caused by PM trapped in the valleys.

Q: What is a particulate matter precursor?
A: Particulate matter can be emitted directly from a variety of sources mentioned above, but other precursor gasses emitted from a variety of sources can react in the atmosphere to form PM, identified as $PM_{2.5}$. Typically the precursor gasses of interest along the Wasatch Front are SO_x, NO_X, ammonia (NH_3), and volatile organic compounds (VOCs). For example, automobiles are the greatest source of PM_{10} and precursors emissions in the Salt Lake Valley, which accounts for up to 30% of the total PM_{10} emissions according to 2008 statewide emissions inventory data.

The formation of $PM_{2.5}$ along the Wasatch Front is primarily a concern during severe wintertime inversions when emissions can be trapped. The elevated levels of fine particulate during inversions are a function of our unique meteorology, topography and emission sources. $PM_{2.5}$ can also be a concern during wind blown dust storms.

Q: What is ground-level ozone and a ground-level ozone precursor?
A: Similar to $PM_{2.5}$, ground-level ozone is not directly emitted by sources in large quantities, but forms in the atmosphere due to precursor emissions of NOx and VOCs, which are considered the primary precursors.[1] When VOCs and NOx react in the presence of sunlight, ground-level ozone is formed. Sources of VOCs include automobiles, gasoline stations, paint, degreasers, cleaning fluids, and many other sources. NOx is emitted primarily by automobiles, power plants and other combustion processes.

[1] CO is also considered a precursor to ground-level ozone, but is not discussed in this brief. For more information about CO, see UDAQ.

Even though ground-level ozone production occurs year-round, the highest monitored levels occur during the summer when strong sunlight, high temperatures, and stagnant meteorological conditions foster the chemical reactions and trap the air in the region. Ozone produced under these conditions can then be transported many miles outside the area where the ozone is formed.

Demonstrating leadership

Given this context, it is important that we demonstrate our commitment to sustainable development and achieving compliance with all applicable regulatory requirements. Though we produce emissions, we have made significant contributions toward reducing our emissions and therefore reducing our impact on the Wasatch Front's air quality.

Measuring our performance

Q: How does Kennecott account for and report emissions to the Utah Division of Air Quality (UDAQ)?

A: We account for and report emissions to UDAQ through annual air emissions inventories using a variety of widely accepted accounting methods including emissions monitoring equipment, stack tests, mass balance, fuel analysis and emission factors.

Q: How do UDAQ and US Environmental Protection Agency (USEPA) define the airshed where Kennecott is located for purposes for managing PM_{10}, $PM_{2.5}$ and ground-level ozone?

A: The planning area for PM_{10} is Salt Lake County. The $PM_{2.5}$ planning area has been formalized and includes all of Salt Lake and Davis counties, and parts of Weber, Tooele, and Box Elder counties. UDAQ and USEPA have not yet formalized the area that will be subject to improvement planning for ground-level ozone. The ground-level ozone planning area has been proposed by UDAQ to include all of Salt Lake and Davis counties, and part of Weber County.

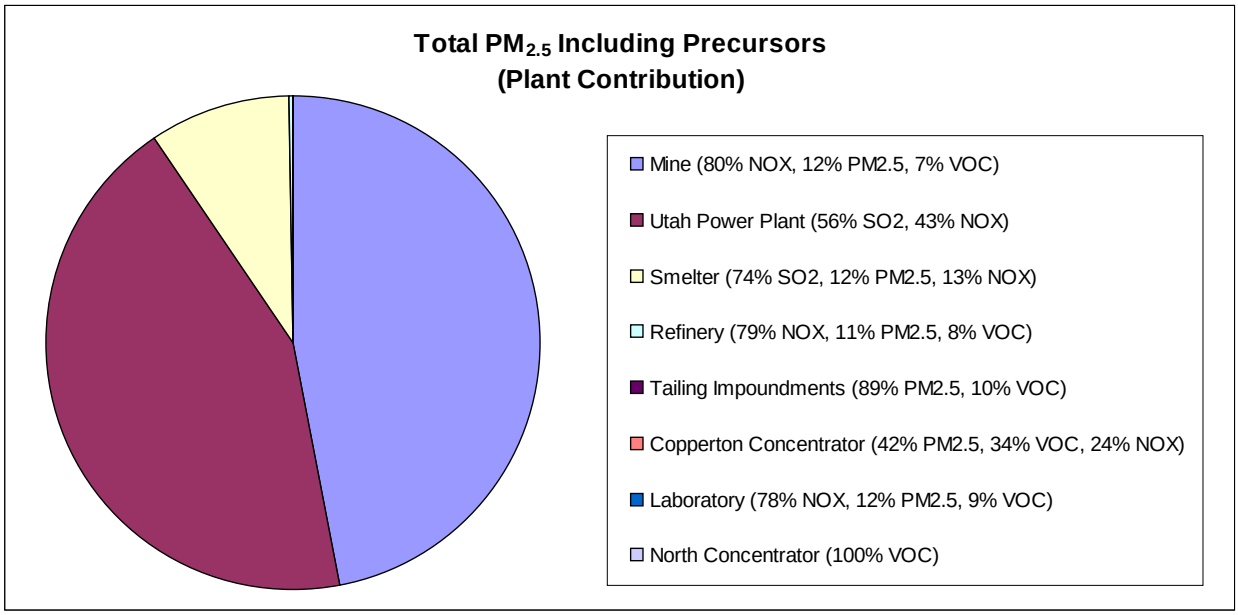
Q: What portion of $PM_{2.5}$ and precursor emissions in the airshed is attributable to Kennecott?

A: The 2008 annual UDAQ air quality emissions inventory (which is the most recent statewide compilation of data) indicates that approximately 5.8%([2]) of all $PM_{2.5}$ and precursor emissions in the airshed originate from Kennecott's operations, based on annual averages. During the winter, our emissions are significantly lower when the $PM_{2.5}$ issue is a problem. This is because we shut down certain operational components in the wintertime, such as tailings dike construction, to reduce dust. In addition, we burn coal in our onsite power plant only between March and October, but not during the winter months when inversions typically occur.

([2]) This percentage was calculated by dividing Kennecott's annual total reported emissions by annual total countywide emissions in Salt Lake, Tooele, Davis, Weber, and Box Elder counties for reporting year 2008 because we did not have access to partial county data. For more information, visit UDAQ's website.

Q: What are the largest sources of $PM_{2.5}$ and precursor emissions at Kennecott?

A: Our 2009 emissions inventory indicates that the largest sources of $PM_{2.5}$ and precursor emissions are the onsite power plant (Utah Power Plant, or UPP) stack emissions and mine haul truck tailpipe emissions, followed by the smelter main stack emissions. Our sources of $PM_{2.5}$ and precursor emissions are shown graphically below. This graphic represents the portion of 2009 reported emissions of $PM_{2.5}$ and precursors attributable to each source, and indicates the type and percentage of emissions coming from that source – either direct $PM_{2.5}$ or $PM_{2.5}$ precursors.



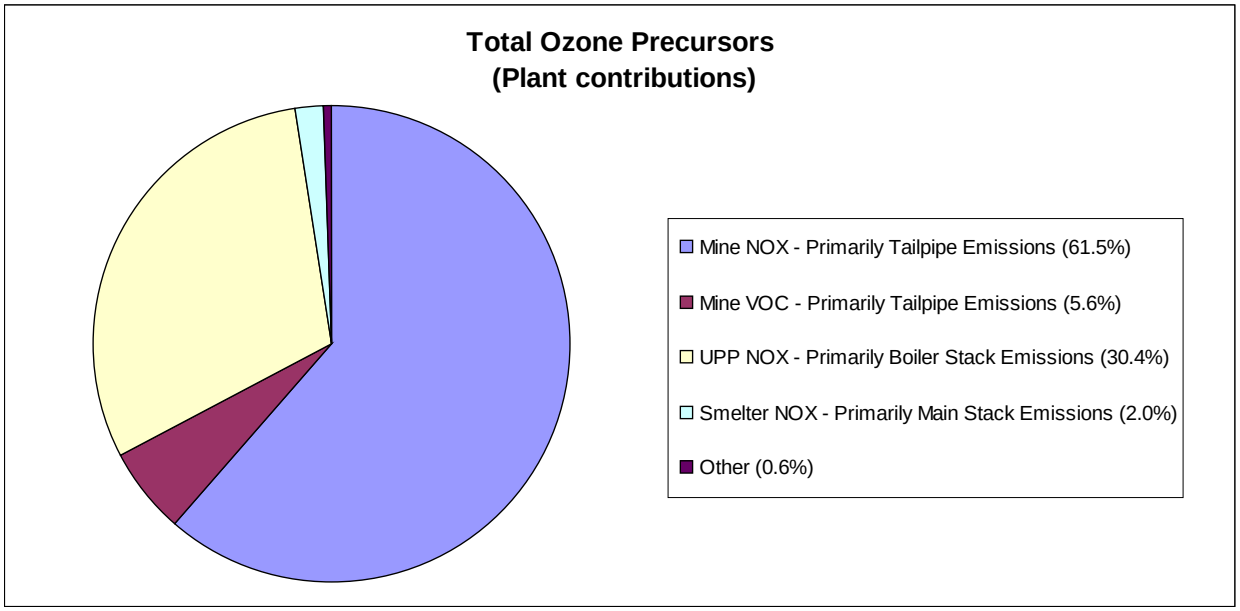
Q: What portion of ground-level ozone precursor emissions in the airshed is attributable to Kennecott?

A: The 2008 annual UDAQ air quality emissions inventory indicates that approximately 7%([3]) of ground-level ozone precursor emissions, in the airshed defined above, originate from our operations.

Q: What are the largest sources of ground-level ozone precursor emissions at Kennecott?

A: Our 2009 emissions inventory indicates the majority of our ozone precursor emissions occur as NOx, primarily from mine tailpipe emissions and UPP stack emissions. VOCs are also emitted, in much smaller amounts, as a result of tailpipe emissions at the mine.

([3]) This percentage was calculated by dividing Kennecott's annual total reported emissions by annual total countywide emissions in Salt Lake, Davis, and Weber counties for reporting year 2008 because we did not have access to partial county data. For more information, visit UDAQ's website.



Q: What portion of PM_{10} and precursor emissions in the airshed is attributable to Kennecott?

A: The 2008 annual UDAQ air quality emissions inventory (which is the most recent statewide compilation of data) indicates that approximately 16.6%([4]) of all PM_{10} and precursor emissions in the airshed originate from Kennecott operations, based on annual averages.

During the winter, when inversions typically occur, Kennecott's PM_{10} and precursors emissions are significantly lower as a result of seasonal shut downs of certain operational components, such as tailings dike construction and the coal-fired power plant.

Q: What are the largest sources of PM_{10} and precursor emissions at Kennecott?

A: The 2009 emissions inventory (the most recent, reported Kennecott emissions inventory) indicates that the largest sources of PM_{10} and precursors are mine mobile tailpipe and road dust emissions, followed by power plant (Utah Power Plant, or UPP) stack emissions. Kennecott sources of PM_{10} and precursor emissions are shown graphically below. This graphic represents the portion of 2009 reported emissions of PM_{10} and precursors attributable to each source and indicates the type of emissions coming from that source – either direct PM_{10} or PM_{10} precursors.

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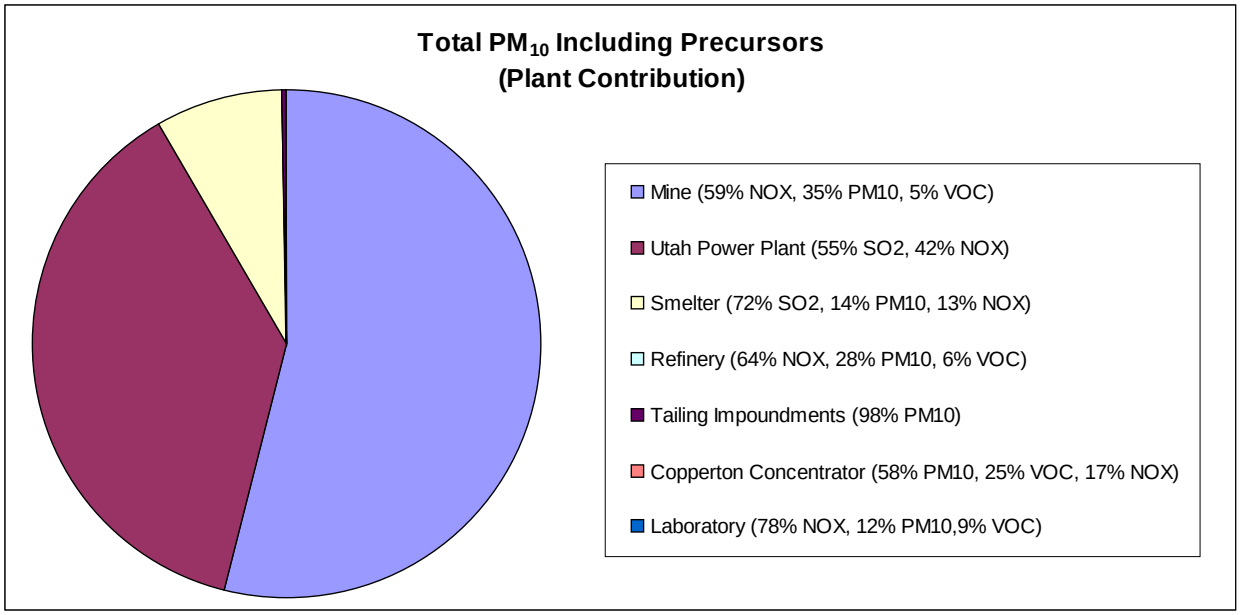
([4]) This percentage was calculated by dividing Kennecott's annual total reported emissions by annual total countywide emissions in Salt Lake County – the management area for PM10 - for reporting year 2008.



Q: Do PM_{10} emissions emitted at the Bingham Canyon Mine directly affect air quality in along the Wasatch Front?
A: A 1996 study completed by the University of Utah showed that a large portion of PM_{10} emissions generated in the open pit mine are retained in the pit and do not migrate into the surrounding valleys. This phenomenon is referred to as "in-pit settling."

Q: How does Kennecott account for tailpipe emissions from its mobile equipment fleet?
A: We calculate emissions of NO_X, PM_{10}, $PM_{2.5}$, VOC, and CO from our haul truck fleet using US EPA published emission factors and SO_2 emissions are calculated based on sulfur analysis of the diesel fuel we burn.

Q: How does UDAQ calculate emissions from transportation and area sources?
A: UDAQ uses generally accepted transportation models and calculation methods to calculate emissions from transportation and area sources. These calculations also factor into federal highway funding and a variety of other regulatory purposes.

Reducing our impact

Over time, we have embarked on a number of different internal business improvement projects that achieve mutual benefit for our company but also the community. Specifically, we have initiated a number of business improvement projects to proactively prevent particulate matter emissions, and in some cases reduce our greenhouse gas emissions. A summary of the key projects are as follows:

Operations

1. Energy and Greenhouse Gas Management: We are committed to continual improvement in energy efficiency across the business while improving how we

manage, generate and use energy. Improving our energy efficiency and thus reducing our air emissions is a top business priority. The development of an operational energy management program is helping to achieve our energy efficiency goals by accurately metering and actively managing our use of energy, managing peak loads, completing a variety of improvement projects such as improving motor and pump efficiency, lighting upgrades, and improving the efficiency of ore crushing and flotation operations.

We are looking at a variety of solutions to better manage energy use and GHG emissions. Currently, we generate about 10% of our total electricity needs using alternative technologies. Specifically, a waste-heat power generation system at our smelter (one of the cleanest smelter's in the world) captures waste heat from the two furnaces (the flash-smelting and converting furnaces) at the smelter's acid plant (see below) and uses it to generate about two-thirds of the smelter's electrical demand. We also have a 32.5-kilowatt solar photovoltaic system at our reverse osmosis water treatment plant. Also, our LEED platinum administration building, the Rio Tinto Regional Center in Daybreak, has a 19-kilowatt solar photovoltaic system (located on the roof of the building) to generate a portion of the building's energy needs.

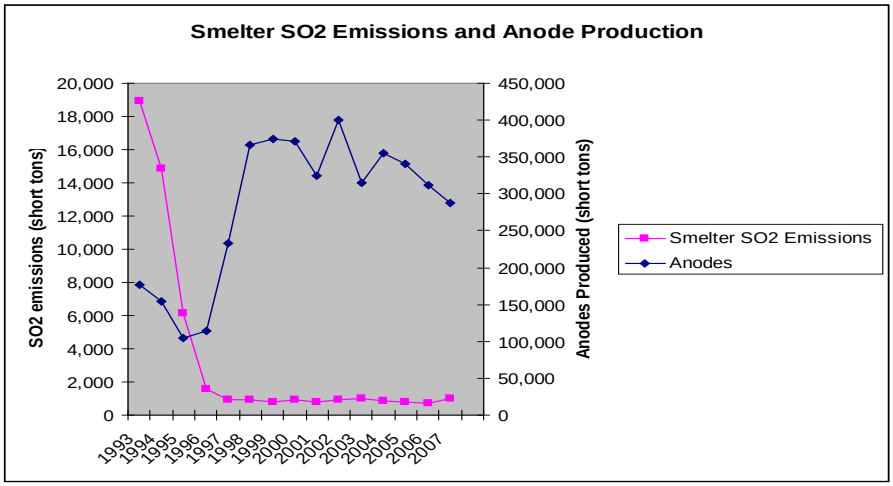
In 2010, we invested over $10 million dollars in a 6-megawatt combined heat and power (CHP) unit, which will be installed at our copper refinery. We have also received approval for an additional CHP unit for a new facility. With the addition of these units, about 15% of our total electricity demand will be supplied by renewable and/or alternative resources and we will have invested more than $50 million in alternative energy. We have explored additional renewable and alternative energy technologies to meet our energy needs, including solar, wind, geothermal and hydroelectric power generation opportunities.

We are evaluating additional base load power generation options to meet our existing and future electrical requirements. Current evaluations underway include retrofit opportunities at the existing power plant, and possible expansion of generation capacity using combined cycle gas turbines.

For more information, please see our Energy and Greenhouse Gas Management Information Brief.

2. Operating one of the Cleanest Smelters in the World: Modernized in 1995, our Smelter captures 99.9 percent of all sulfur emissions and is still considered the cleanest copper smelter in the world. The new technology incorporates an enclosed process when producing copper, and allows for a larger transfer of the SO_2 to the acid plant, which is the primary pollution control device for SO_2. At the acid plant, SO_2 is converted to sulfuric acid, which is sold commercially for uses in agriculture and industry. In addition, the modernized smelter also virtually eliminates all open-air exchanges of molten material. The smelter is able to generate 65% of its electrical power needs by capturing waste heat from the flash smelting and converting furnaces at the acid plant, and using it to generate electrical power. We have made additional upgrades and improvements to the Smelter, such as in 2000 when we

upgraded to dilute oxygen combustion (DOC) burners which resulted in an 80% reduction in NOx emissions.



3. Power Plant: Air emissions at our power plant are reduced through a variety of means, including:

    - Burning low sulfur coal,
    - Using electrostatic precipitators, which collect particulates that would otherwise escape into the air,
    - Using low-nitrogen oxide burners, designed to reduce the formation of nitrogen oxides, particularly when burning coal.

    Also, we close the power plant each winter (between November 1 – the end of February.) During this period, we purchase power for KUC operations from the utility grid.

4. Dust Control: The reduction of dust is an on-going part of operations at the tailings impoundment, concentrator, and the mine. This is accomplished through a variety of means, including revegetation, watering roads, and construction of a peripheral discharge system for tailings to keep the impoundment surface wet, preventing major dust discharges into the air. We also use chemical dust suppression, such as the application of magnesium chloride at the mine, and chemical dust suppression polymer and big gun sprinklers to suppress dust at our tailings impoundment.

Transportation

5. Mine Haul Truck Improvement and Management Projects: We operate a large haul truck fleet at the Bingham Canyon Mine. The following are improvement projects that have led to decreased emissions.

    a. Fleet Engine Replacement: In absence of regulatory requirements, we voluntarily replaced the engines in our entire Bingham Canyon mine haul truck vehicle fleet with cleaner burning diesel engines (i.e., we replaced most

non-rated engines with Tier 1 compliant engines, and soon will be adding new Tier 2 and Tier 4-transitional compliant engines), reducing our overall tailpipe emissions per unit of production.

b. Mine Haulage Truck Idle Reduction Project: To help manage our fuel costs and improve emissions output, a team of engineers and Six Sigma Master Black Belts used the LEAN Six Sigma business improvement methodology to complete an idle reduction project in 2009. The project led to a 30% reduction in idle time, $94,000 saved due to decreased fuel consumption, and prevented 500 tonnes of CO_2-equivanlent and 18,000 pounds of NOx emissions. These benefits are expected to be sustained over time.

6. Transition to Ultra Low Sulfur Diesel Fuel: We have used on-road specification diesel fuel for 20 years in our off-road equipment. In 2007, an EPA ruling required a reduction in sulfur content in all on-road specification diesel fuel (i.e., formerly 50 ppm and now is 15 ppm). Because we continue to use only on-road specification diesel fuel in our equipment, we also made the transition. All of our diesel-powered equipment runs on this ultra low sulfur diesel fuel, which has led to a decrease in our SO_2 emissions.

7. Light, Medium and Heavy Mobile Equipment Fleet Vehicle Idling Reduction Project: In 2008, we completed a vehicle idle reduction pilot project involving 28 vehicles in total (10 heavy mobile, and 18 light and medium duty vehicles), for which we won the 2009 Outstanding Achievement in Pollution Prevention Award from the Utah Department of Environmental Quality. Due to the success of this pilot in reducing idle time, fuel consumption, and emissions, over half of our entire light and medium duty fleet vehicles are now in the program. By the end of 2009, the project has led to $1.5 million in fuel savings and prevented 5100 tonnes of CO_2-equivanlent from being emitted.

Buildings

8. Leadership in Energy and Environmental Design (LEED) Certification: We are committed to ensuring that our new buildings are built to meet high efficiency standards, and in some cases meet LEED standards for the use of recycled building materials, increased use of natural lighting, reduced water and energy consumption, and innovative design. Most recently, our new Daybreak Corporate Center achieved LEED Platinum certification, and was the first building in Utah to receive this distinction. In addition, three of our other facilities (the Kennecott Mine Administration Building, Bingham Canyon Mine Visitor's Center, the Rio Tinto Distribution Center, and the Daybreak Community Center) have achieved some level of LEED certification. Our distribution center is equipped with a state-of-the-art computer controlled storage and retrieval system allowing for a reduction of originally programmed square footage by nearly 30 percent and reduces the buildings carbon footprint.

9. High-performance Green Homes: All homes in Kennecott Land's Daybreak meet and sometimes exceed Energy Star ratings. In addition, Daybreak community was

highlighted during the 2008 Parade of Homes™ by displaying four high-performance green homes that were constructed above and beyond current energy star standards. The homes are unique by including advanced construction techniques and technologies, resulting in significant reductions in energy usage and utility bills. Some of these features include:

a. Solar thermal collectors that capture the sun's energy to heat water. A panel area of 20 square feet prevents the release of approximately 70 pounds of carbon dioxide into the atmosphere every year.
b. A net electrical meter which takes unused electricity and feeds it back to the power company, so the meter actually runs backwards when there's more electricity produced than needed.
c. A tankless water heater allows more than seven gallons per minute without wasting heat to store hot water, allowing residents to wash dishes, clothes, and take a shower at the same time while saving energy and space.
d. Low-flow showerheads and faucets look and perform just like traditional fixtures, but use less water – as much as 50 percent less.

Employee Initiatives

10. Flex Schedules and Telecommuting: Some of our employees are allowed to follow flexible work schedules that involve staggered shifts, job sharing and modified work schedules. Implementation of the program is expected to gain $800,000 in turnover savings and raise productivity by 3% - as well as reducing our employees' impact from transportation.

Continued improvement

Kennecott will continue to closely evaluate air emissions reduction technologies not only for new facilities and processes, but for future modifications in its operations as well.