Environmental Management in SCCL

SCCL is environmentally conscious, responsible and proactive. SCCL's prime objective is to ensure that coal mines are operated in a manner that protects citizen and the environment during mining, to ensure that the land is restored to beneficial use following mining and to mitigate the effects of mining by aggressively pursuing reclamation of mines. SCCL's initiatives in protection of environment start from the exploration stage itself where preferences are given for mining coal in non-forest areas there by reducing pressure on natural eco-systems. Subsequently, in the operation stages, SCCL has been taking necessary measures for prevention/control of various pollutants.

SCCL is successful in implementing the unique Biological Engineering techniques for the reclamation of Overburden dumps. The objective of Biological Techniques is to transform the waste and degraded land created due to mining operations into a sustaining ecological landform which will also prevent soil erosion, siltation of water bodies, water pollution, dust pollution and re-create the aesthetic beauty of the environment.

ENVIRONMENTAL INITIATIVES:

1. AIR POLLUTION CONTROL MEASURES:

- Effective water spraying arrangements are made at coal loading bunkers at pithead on surface and at coal transfer points in the mines and coal handling plants.
- Sensor activated water spraying plungers were fixed in unloading points to conserve the water and to make the system fool proof mechanism.
- Solenoid controlled water spraying arrangements were made on the belt conveyors so as to activate the water spraying plunger only when the belt is running with load.
- All the roads connecting mines, CHP's, workshops and colonies has been black topped in the SCCL mining areas to prevent dust from becoming airborne.
- Periodical maintenance of vehicles is carried out as per Manufacturer's standards.
- To reduce air pollution load due to burning of coal & wood for domestic purposes, free coal supply arrangement to all the employees has been replaced with free LPG supply.
- SCCL has deployed 39 No's of mobile water sprinklers in opencast mines for dust suppression on haul roads and coal transport roads. Total cost of these sprinklers is Rs.1897.35 Lakhs (Approx.). The operating cost of 39 sprinklers of 28 KL capacity is around Rs.7.90 Crores.
- Water spraying lines with timer control has been established in OCs where haul road is of permanent nature.
- Wet-drilling methods are adopted in OC mines.
- Coal transport trucks are covered with tarpaulin sheets during coal transportation for prevention of spillage and resultant dust pollution.
- Dust generation from the OB dump due to wind are controlled significantly by planting grasses on slopes and plants on dump top soon after their formation.
- Homestead and institutional plantation is done extensively to filter the air pollutants.

- Avenue plantation is raised along roads for dust control. Plantation is done around the quarry and OB dumps, which serves as a barrier to prevent the dispersion of air borne dust.
- Crusher houses are enclosed to the extent possible. Conveyors and screens are provided with covers to avoid fugitive dust generation during their operation.
- Minimizing the height of fall of coal at all coal transfer points.
- Internal lining of chutes and bins is done to take care of abrasion & dust.
- 4 Nos. of Electro static precipitators (ESP's) have been commissioned at captive power plants.

2. WATER POLLUTION CONTROL MEASURES

- Ground water seeping in to underground mines and opencast workings is pumped out as mine discharge, is treated for removal of suspended solids and is mostly used to meet the company's requirements.
- Mine discharge is treated by sedimentation, filtration and chlorination when used for drinking purpose. Remaining water is utilized for dust suppression.
- Garland drains are made along the dumps and along the lease area to restrict the suspended solids entering into the natural water regime as well as to prevent storm water entering the lease area.
- Settling tanks are made in the opencast mines for settlement of suspended solids before pumping the water out of the mine.
- 16 ETPs are provided for the removal of oil and grease in HEMM workshops at a cost of Rs.52.68 lakhs.
- Septic tanks followed by soak pits are established to treat the domestic wastewater generated from the mine office.
- 7 Nos. Sewage Treatment Plants (STPs) at a cost of Rs. 841.32 Lakhs, 2 Nos. natural oxidation ponds and septic tanks followed by soak pits have been provided to treat domestic effluents generated from the colony.
- SCCL has constructed 236 Nos. of Sulabh Toilet Complexes at various townships and mines.

3. NOISE POLLUTION CONTROL MEASURES

- To dampen the noise levels at CHP, impact rollers are provided at transfer points.
- Height of fall is minimized at all coal transfer points and also internal lining of bins and chutes was done.
- Green belt is developed around CHP and mine colony interface etc., to dampen the noise.
- In the high noise intensity working areas / zones earmuffs or earplugs are provided to the workmen.
- Regular noise level monitoring is being done periodically for taking corrective action, wherever required.
- Proper maintenance and tuning of machinery is done regularly.
- Proper maintenance of plant and machinery and improvement on design of machines.
- Acoustically designed operator's cabin in HEMM.

- The greenbelt with species of rich canopy around the lease area and along the roads is developed for further attenuating the noise levels.
- Blasting operations are carried out with proper hookup and optimum explosive charge.

4. WATER CONSERVATION MEASURES

- Around 60% of the mine seepage water in entire coal belt of SCCL is used for drinking, industrial and plantation purposes after necessary conventional treatment. Excess water is released in to nearby irrigation tanks, which are being used by nearby villagers for irrigation and also augmenting of ground water table.
- Water conservation measures in its lease area by way of continuous contour peripheral trenches.
- Ground water levels are being periodically monitored though a network of 261 observation wells and 61 peizometers in the mining areas and surrounding villages and mine water is being supplied to villages where water scarcity has been reported.
- Check dams/rock fill dams are constructed wherever necessary to reduce siltation with suspended solids.
- Treated workshop effluents are also re-used for dust suppression and for raising plantation within the workshop premises.
- Domestic effluents are being treated in Sewage Treatment Plants (STPs) and the treated water is being used for raising of plantation, Nursery, Gardens, etc. and STP Sludge is being used as manure in block plantations and OB Plantations.
- SCCL has constructed 641 rain water harvesting structures in all the mining areas.
- SCCL is helping surrounding villages for de-silting of agricultural tanks in the mining areas which aids in more water retention and augmentation of ground water table.
- Summer storage tanks being constructed at RG OC-II, RG OC-III and Medipalli OC Projects.
- Creating awareness among SCCL employees about water conservation through posters, video films and pamphlets.
- SCCL has planned to leave the voids of opencast project as water bodies which helps in retention of large quantities of water and rain water harvesting.

5. PLANNING FOR ECO-FRIENDLY MINING

The environmental safeguards were considered in planning stage itself to integrate with the operations. Following measures were considered in planning stage:

- No forestland used for dumping of OB and Infrastructure requirements.
- Dumps are planned as possible as in non-agriculture lands.
- Dumps are planned away from the water courses and water bodies.
- Concept of relay projects where ever possible to minimize the land requirement by filling of OB in subsequent quarry in void of previous quarry.
- Design of the dumps in such a way to control the soil erosion and early establishment of the plant growth.

- The opencast mines are being planned in the relay concept, by which the requirement of land will be reduced and the voids can be better managed.

6. CONSERVATION OF FORESTS

Coal mining is site specific and generally occurs in forest areas. While planning a project, the requirement of forest land is kept minimum. Land required for dumping of over burden (OB), workshops and other supporting activities are invariably planned in adjacent non-forest land unless there is no such land in the vicinity. The forestry department of the Company has raised up clonal plantations to meet the internal requirement of timber supports for underground mines to minimize the procurement of timber from Forest Department.

Alternatives for timber to reduce the pressure on the forests:

- Iron cogs are in use in lieu of the chock stacks
- Hydraulic steel supports are in use replacing the wooden props
- Roof bolting is resorted to improve safety and maneuverability in UG mines
- Technology up gradation is also helping in the reduction in the timber consumption

7. BIO-DIVERSITY CONSERVATION

The destruction of natural habitat is a necessary evil in coal mining process. SCCL has taken measures to conserve the endemic species as well as created gene pool for many species in the theme based arboretum concept and genus specific plantations. Herbarium of coal belt area is also established in the SCCL degree college. These plantations apart from conservation value have lot of educational value for students in the nearby educational institutions.

Bamboosetum: 21 species of Bamboo, Ficarium: 14 species of Ficus, Palmatum: 42 species of different palms, Endemic species 2 : Cycas and Redsanders, Arboretum, Raasivanam, Navagraha vanam, Karthikavanam, Medicinal plants: 48 species, Aquatic habitat development: Fishery & birds, etc.

8. GREENBELT DEVELOPMENT

SCCL has implemented plantation programs to develop and enhance ecological assets that provide economic benefits while improving the environment. Reforestation creates economic value through the carbon storing capability of trees. SCCL has taken up plantation way back in 1966. Plantation is done under categories namely Overburden dumps, Block plantation and avenue plantation. Apart from the above, Homestead plantation and Institutional plantation is also done. About 150 species have been planted including species like Red Sanders. Planting activities started in SCCL in 1966 onwards and up to 2011 about 6330 Ha. brought under vegetation. SCCL has planted 97, 79,967 saplings and maintaining in above said area. SCCL is maintaining nurseries at KGM, RGM & BPA regions with a capacity of 10,00,000 saplings.

About 2,00,000 saplings (Fruit bearing and clones) are being distributed to surrounding villagers every year. During 2010, about 1, 89,266 saplings were distributed to formers for plantation covering 140 Ha area in their fields. During 2011, about 1,62,500 saplings were distributed to formers covering 92.50 Ha in their fields.

9. TOP SOIL MANAGEMENT

Top soil is preserved separately for spreading on over burden dump. Achieving a stable surface was the fundamental objective of rehabilitation and establishment and maintenance of an effective vegetation cover was key to soil erosion control. Dumping of top soil in heaps over the top of the dump has given good results by retaining water in the gaps. Preservation of top soil is restricted to its shelf life and during its preservation treated with Stylosanthes hamata and other pioneer species to preserve the nutrients.

10. SOIL CONSERVATION MEASURES

The following Soil Conservation Measures (SCM) works are taken up especially on OB dump slopes which are highly prone to soil erosion.

- The following Engineering structures are used to control soil erosion and facilitate better survival of plantation –
  - Toe walls
  - Rock filled dams
  - Gabion structures
  - Cribbs
  - Staggered contour trenches and
  - Garland drains
- Heavy broadcasting of Leguminaceas seed of Stylosanthus Hamata
- Dibbling of species of Babul, Subabul, Sesbania etc. In continuous rows to check the velocity of runoff water
- Dumping of top soil in heaps to retain water in the intervening spaces between heaps

11. BIO-MEDICAL WASTE MANAGEMENT:

Bio-medical waste is being handled through the authorized agencies by APPCB to comply the guidelines of Bio-Medical waste Management and Handling Rules. SCCL Main Hospital, Kothagudem received award from A. P. Pollution Control Board for its best practices in bio - medical waste disposal in the state during the year 2007.

12. ENERGY CONSERVATION MEASURES

The following measures are being implemented in SCCL for reducing energy consumption:

- Specific power consumption for coal production reduced from 23.33 Kwh/T in 1999-2000 to 12.49 Kwh/T in 2009-10.
- Conversion to HVDS with 10 KVA PMTs – 3644 No.s commissioned at a cost of Rs. 6.38 Crs.
- 1,68,968 no.s of 11 W CFLs on easy installments issued to workmen with a cost of Rs. 3.39 Crs.
- Introduction of 36W FTLs with electronic chokes at subsidized price – 75228 issued with a cost of Rs. 4.11 Crs.
- Replacement of old high wattage ceiling fans (80-120W) with energy efficient 50 Watt fans & electronic regulators – 1823 issued with a cost of Rs. 0.11 Crs
- LP Gas based Geysers to replace electric storage water heaters 20 no.s issued on trial basis.
- Installation of automatic control switches for streetlights in colonies, yard lights and quarry lighting systems.

- Installation of energy efficient bore hole pumps & Re-organization of pumping and haulage layouts in mines.
- High efficiency squirrel cage induction motors introduced in place of slip ring induction motors for high capacity pumps.
- Installation of solar water heaters in mines & hospitals as a part of usage of non-conventional energy. In future also it is planned to further increase the usage of solar power in a big way.
- Improvement of ventilation circuits to reduce mine resistance /change of blade angle.
- Conversion of existing 440 V system to 550 V.
- Idle running of equipment, man riding systems, trunk conveyor belts etc.
- 120 No.s of automatic electrical load monitoring devices were installed
- 336 No.s of old air conditioners were replaced with energy efficient models.
- 400 No.s of automatic electronic control switches were fitted to street lights.
- Cluster LEDs were installed in street lights to replace 250 W Sodium Vapor Lamps.
- Old electrical machinery is replaced with energy efficient machinery in phased manner.
- The decision has been taken not to use the motors of rewound more than 5 times.
- Total Rs. 18.83 Crs were spent towards energy conservation measures.
- All new star rated electrical appliances are being purchased
- Installation of solar water heating systems in mines, guest houses and community buildings.

13. WASTE RECYCLING AND REUSE

Waste generated from use of material in various mining operations is collected and disposed off through auction to APPCB authorized agencies. The waste products are mostly HEMM/vehicle tyres, ropes, old batteries, barrels, drained/used transformer/lubricant oils, drill bits/rods, mine tub and electrical motor scrap, scrapped vehicles/HEMM, mild steel/cast iron scrap etc. Some of the above items such as drill rods are used for fencing. Used haulage ropes are re-used for roof stitching as support. Drained/used lubricant oils are re-used for lubricating mine tub axles.

Oil collected from Oil & Grease traps in Workshops is reused for mine tub lubrication- a waste having high potential for damage of aquatic environment. Old conveyor belts are re-used as temporary ventilation stoppings, wipers at unloading points along the coal conveyors. Compost pits are constructed in mines and office complexes. Water treated in ETPs at all the workshop facilities is reused 100% for plantation within the premises.

SCCL has taken following initiative for fly ash utilisation:

In collaboration with the Central Mining and Fuel Research Institute (CMFRI), Dhanbad, a study for stowing fly ash in one of the underground mines in Ramagundam was taken up during 94-96. SCCL & HWP, DoAE has jointly taken up pilot project under guidance of Fly Ash Mission, CMFRI & DGMS for stowing of pond ash in the underground mines. About 8,000 to 10000 Cu. M. of pond ash was successfully filled in a depillaring district.

Traditional clay bricks were replaced with fly ash bricks in all construction works since 2001. From 2003-04 fly ashes is being used 100% in all construction works. SCCL got the National Fly Ash utilisation Award 2005. In place of Clay bricks and Cement bricks, Fly Ash bricks utilised as below in Singareni as an Environmental Protection measure.

Year	No. of bricks in Lakhs	Volume in Cu.m.
2004-05	10.00	2000
2005-06	109.00	21935
2006-07	100.00	20000
2007-08	50.00	10000
2008-09	90.28	18056
2009-10	101.08	20216

14. ENVIRONMENTAL INITIATIVES BEYOND MANDATE

SCCL has also started initiation to take up development of comprehensive ecosystem in the surrounding areas of SCCL beyond mandate with the following activities:

- Plantation in degraded forest lands of surrounding area with concurrence of State Forest department.
- Creation of percolation tanks in the adjoining forest areas and SCCL areas to improve the rain water augmentation and potentiality of fodder grass.
- Construction of check dams/nallah bunds/galley plugs/RFDs for ground water augmentation.
- Plantation in private lands in the surroundings in the form of Social Forestry.
- Avenue plantation along the approach roads/routes leading to the surrounding villages.
- Comprehensive development of ecosystems in the already developed plantations in SCCL Lands with SMC works, introduction of multi species, habitat amelioration measures.

*****