

## CONTENT

|  | Page |
|--|------|
| OPENING SESSION  | 1    |
| OPENING REMARKS  | 2    |
| WELCOMING REMARKS  | 3    |
| KEYNOTE ADDRESS – PROVIDING A SOLUTION   | 4    |
| THE BUREAU OF MINES RESPONSIBILITIES IN MINERALS RELATED SOLID WASTE<br>RESEARCH                       | 7    |
| SOLVING SOLID WASTE PROBLEMS THROUGH RESOURCE RECOVERY   | 11   |
| THE NATIONAL CENTER FOR RESOURCE RECOVERY, INC.  | 15   |
| MARKETS AND RECYCLING OF FERROUS SCRAP   | 21   |
| ASH UTILIZATION – VIEWS ON A GROWTH INDUSTRY   | 27   |
| RECYCLING CONTAINER GLASS – AN OVERVIEW  | 35   |
| LEADERSHIP FOR RECYCLING : REORIENTING ECONOMIC AND ENVIRONMENTAL<br>PRIORITIES                        | 45   |
| <u>SESSION NO I – UTILIZATION OF INDUSTRIAL WASTES</u>   | 49   |
| PROCESSING AND UTILIZATION OF STEELMAKING SLAGS  | 51   |
| RECOVERY OF METAL VALUES FROM INDUSTRIAL SLAGS BY THE USE OF A TWO-<br>PHASE MOLTEN ELECTROLYTE SYSTEM | 55   |
| RECYCLING OF STEELMAKING DUSTS   | 63   |
| UTILIZATION OF FOUNDRY WASTES  | 69   |
| APPLICATIONS OF SILICATE WASTES FROM PAPER PROCESSING  | 75   |
| DEVELOPMENT OF CARBON PRODUCTS FROM LIGNIN (PAPER MILL) WASTES   | 79   |
| TOTAL UTILIZATION OF FLY ASH   | 85   |
| THE EFFECT OF FLY ASH ON SOIL PHYSICAL CHARACTERISTICS   | 95   |
| COAL MINE SPOIL AND REFUSE BANK RECLAMATION WITH POWERPLANT FLY ASH                                    | 105  |
| COPPER-ZINC REMOVAL FROM SCRAP IRON OXIDE BY PELLETIZATION-<br>CHLORIDIZATION                          | 113  |
| <u>SESSION NO. II – UTILIZATION OF MINING AND MILLING WASTES</u>                                       | 121  |
| THE UTILIZATION OF INCINERATED ANTHRACITE MINE REFUSE  | 123  |
| EVALUATION OF ABANDONED STRIP MINES AS SANITARY LANDFILLS  | 129  |
| RECLAMATION OF MINERAL MILLING WASTES  | 139  |
| A DATA BANK ON THE TRANSPORT OF MINERAL SLURRIES IN PIPELINES  | 143  |
| EVALUATION OF SOLID MINERAL WASTES FOR REMOVAL OF SULFUR FROM FLUE<br>GASES                            | 153  |
| ENGINEERING PROPERTIES AND UTILIZATION EXAMPLES OF MINE TAILINGS                                       | 161  |
| UTILIZATION OF FLORIDA PHOSPHATE SLIMES  | 171  |
| UTILIZATION OF BY-PRODUCT FLUOSILICIC ACID   | 179  |
| <u>SESSION NO. III – UTILIZATION OF SCRAP METAL</u>  | 185  |
| OPPORTUNITIES FOR INCREASED RECYCLING OF METAL SOLID WASTE   | 187  |
| AN ECONOMIC ANALYSIS OF THE JUNK AUTO WITH EMPHASIS ON PROCESSING<br>COSTS                             | 195  |
| CHICAGO'S A BANDONED CAR DISPOSAL CONTROL PROGRAM  | 203  |
| ADVANCES IN TECHNOLOGY FOR RECYCLING OBSOLETE CARS   | 213  |
| TECHNOLOGY AND ECONOMICS OF LARGE SHREDDING MACHINES   | 223  |
| HOW RECYCLING MAKES THE USED CAN LIVE AGAIN  | 245  |
| REMOVAL OF COPPER FROM MOLTEN FERROUS SCRAP  | 249  |
| IDENTIFICATION AND SORTING OF NONFERROUS SCRAP METALS  | 255  |
| NEW DEVELOPMENTS IN SMELTING SECONDARY COPPER  | 265  |
| SCRAP UTILIZATION BY SECONDARY ALUMINUM SMELTERS   | 269  |
| A SIGNIFICANT BREAKTHROUGH IN RECYCLING OF NICKEL ALLOY SCRAP  | 275  |

|  |     |
|--|-----|
| IMPROVED RECOVERY OF PRECIOUS METALS FROM SCRAP  | 279 |
| <u>SESSION NO. IV – UTILIZATION OF URBAN REFUSE</u>  | 285 |
| RECYCLING MATERIALS IN URBAN REFUSE  | 287 |
| RECOVERY OF VALUES FROM SHREDDED URBAN REFUSE  | 295 |
| SOLID WASTE RECYCLING AT FRANKLIN, OHIO  | 305 |
| GLASS RECOVERY FROM MUNICIPAL TRASH BY FROTH FLOTATION   | 311 |
| CONCENTRATING GLASS CULLET RECOVERED FROM UNBURNED URBAN REFUSE<br>AN INCINERATOR RESIDUES                                   | 323 |
| SOLID WASTE MANAGEMENT UTILIZING PLASTIC BAGS, SHREDDING AND<br>RESOURCE RECOVERY  | 331 |
| THE NORTHWEST INCINERATOR THE NEWEST STEP TOWARD WINNING THE URBAN<br>REFUSE RACE  | 337 |
| RECOVERY OF ALUMINUM FROM SOLID WASTE  | 345 |
| FEASIBILITY OF MAKING INSULATION MATERIAL BY FOAMING WASTE GLASS<br>EXTRUSION – A MEANS OF RECYCLING WASTE PLASTIC AND GLASS | 353 |
| EFFECT OF CONTAMINANTS IN RECYCLED GLASS UTILIZED FOR GLASPHALT  | 371 |
| REFUSE GLASS AGGREGATE IN PORTLAND CEMENT CONCRETE   | 385 |
| MINERAL WOOL FROM HIGH-GLASS FRACTIONS OF MUNICIPAL INCINERATOR<br>RESIDUES  | 391 |
| CHARACTERIZATION, BENEFICIATION AND UTILIZATION OF MUNICIPAL<br>INCINERATOR FLYASH   | 397 |
| WASTE GLASS AS AN INGREDIENT OF LIGHTWEIGHT AGGREGATE  | 411 |
| PYROLYSIS OF WASTE MATERIALS FROM URBAN AND RURAL SOURCES  | 423 |
| RESOURCE ASPECTS OF PVC IN URBAN WASTE   | 429 |
| CONTINUOUS PROCESSING OF URBAN REFUSE TO OIL USING CARBON MONOXIDE   | 439 |