BROMINE (from brines)

A. Commodity Summary

Bromine is a member of the halogen family of elements. Elemental bromine is highly reactive and occurs in nature only as bromide compounds. Sources of bromide include sea water, subterranean brines, saline lakes, oil and gas well brines, and evaporate chloride minerals including halite (NaCl), sylvite (KCl), and carnallite.[1] Bromide compounds are used in fire retardants, agriculture, petroleum additives (ethylene dibromide is an antiknock additive in leaded gasoline), and well drilling fluids. Domestic consumption of bromide was estimated to be 287 million kilograms in 1994.[2]

According to the U.S. Bureau of Mines, companies in Arkansas and Michigan were responsible for all elemental bromine production in 1993. Exhibit 1 presents the names, locations, and types of operations employed by the facilities involved in the production of bromine. The Dow Chemical Company (Dow) in Ludington, Michigan is not directly involved in the purification of bromine; however, Dow removes bromine from its magnesium brines because it is an impurity in their magnesium operation. Dow ships the recovered bromine to the Ethyl Corporation in Arkansas to be purified and prepared for sale.

EXHIBIT 1

SUMMARY OF BROMINE FACILITIES

Facility Name	Locations	Type of Operations
Dow Chemical Company	Ludington, MI	Brine extraction prior to production of magnesium chloride. Sent to Ethyl Corporation for purification.[a]
Ethyl Corp.	Magnolia, AR	Brine Extraction
Great Lakes Chemical Corp.	El Dorado, AR (3 plants)	Brine Extraction

[1] M.J. Wilhelm and K.C. Williams, "Bromine Resources," from Industrial Minerals and Rocks, 1994, 6th ed. p. 187.

[2] Phyllis Lyday, "Bromine," Mineral Commodity Summaries, 1995, U.S. Bureau of Mines, p. 34.