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SECTOR PLAN FOR HALON PHASE-OUT IN CHINA

(Submitted by the World Bank)

INCREMENTAL COST COMPARISON

SECTOR PHASEOUT
VS
PROJECT-BY-PROJECT APPROACH

An addendum to the:

Sector Plan for Halon Phaseout in China

1.0 INTRODUCTION[1]

1. In 1995, the view that complete phaseout of ozone depleting substances (ODS) in a given sector could be accomplished at a lower cost than the project-by-project approach led to the initiation of preparation of the Sector Plan for Halon Phaseout in China. The resulting phaseout plan which incorporates comprehensive policy and competitive grant allocation measures supports such a view.

2. China's proposed Sector Plan for Halon Phaseout accelerates the phaseout of 30,000 ODP tons of halon 1211 from 2010 to 2006 greatly enhancing the global environmental benefits of phaseout. The accelerated halon 1211 phaseout achieves incremental emission reductions totaling 236,000 ODP tons compared to a project-by-project approach[2]. As elaborated below, these important ozone layer benefits would be achieved for less than $1.00 per kg of ODP phased out and would save money compared to individual project implementation. China's halon sector plan would also achieve an additional phaseout of 7,500 ODP tons of halon 1301 by 2010, however, as more is known about halon 1211 phaseout costs, cost savings is established comparing halon 1211 project-by-project costs with sector approach costs.

3. Under the traditional project-by-project approach, individual projects must be submitted and accepted before funds are assured. To meet the 2002 Montreal Protocol halon production and consumption freeze requirements, a government would only need to introduce controls by that time. Absent up-front funding guarantees, it is unlikely that governments would put in place binding ODS controls in advance of Protocol requirements, especially in cases where substitute technologies are not widely available, are more expensive, and/or require capital investments by enterprises. Under a sector approach, incremental costs for the complete phaseout program would be agreed up-front. Confident in the level of Multilateral Fund support for halon phaseout year-by-year, the Government of China would, according to its sector plan, impose production quotas starting in 1997 for an accelerated halon 1211 phaseout. In addition, competition for grants under the sector approach would encourage more strategic use of funds than the project-by-project mechanism which awards grants on a first-come-first-serve basis.

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[1] This note should be considered as an addendum to the Sector Plan for Halon Phaseout in China has been submitted to the Executive Committee of the Multilateral Fund.

[2] Using project-by-project "base case" assumptions; 10 percent conversion/closure and 5 percent growth per year through 2001 and then following MP schedule.

2.0 KEY ELEMENTS OF THE INCREMENTAL COST COMPARISON ANALYSIS

1. By comparing the phaseout costs of halon 1211 under China's sector approach with a project-by-project approach, the MLF would save about 27% by supporting the sector plan.

Table 1: SECTOR APPROACH SAVINGS COMPARED TO PROJECT APPROACH

Cost Component	Sector Approach	Project Base Case	Percent Savings
Closure Halon 1211	$14.69	$17.18	14%
Conversion Halon 1211 Extg. Plants	$19.37	$26.94	28%
Banking Halon 1211	$3.70	$7.72	52%
Total NPV	$37.76	$51.85	27%[3]

2. Key elements of the incremental cost analysis and comparison are as follows:

(a) Comparison based on three cost components of halon 1211 phaseout - more than 80% of eligible incremental costs. The savings which would accrue to the Fund through approval of the sector approach are best understood by comparing costs for three of the major cost components in the halon sector plan: closure of halon 1211 producers, conversion of halon 1211 extinguisher manufacturers, and halon 1211 banking. These three cost components comprise 81% of the halon 1211 investment phaseout costs and provide a good indication of the relative difference between a project and sector approach. Moreover, the approaches adopted to calculate the eligible incremental costs for recycling, systems, service stations, do not lend themselves easily to comparison with project approach.

(b) Project-by-project assumes 10% conversion per year and growth of 5% prior to MP controls. The base case project-by-project approach assumes that about 10% of halon 1211 extinguisher production would be converted each year and that production would be closed down by a corresponding

[3] Adjusting growth rate from zero to 10%. The percent savings ranges from 23-29 percent.

amount.[4] Beginning in 2002, conversions and closures would be done sufficient to meet the Montreal Protocol controls. At the same time, it was assumed that funding for halon phaseout projects would increase the effectiveness of policy measures, such as the ban on non-essential use and prohibitions on new halon producers and extinguisher manufacturers thereby limiting halon growth. Instead of historical rates of 15% growth per year in the fire protection sector, the base case assumes that halon extinguisher production would grow at only 5% per year until the year 2001 (the additional 10% anticipated growth would be covered by substitutes) after which reductions would follow Montreal Protocol controls.

(c) Funding based on existing plant capacity. Under the base case conversion and growth assumptions, peak halon production and consumption would not exceed the capacity of existing plants. Given the assumptions for exports and servicing used in the sector approach analysis, halon 1211 production would, under the base case, grow until the year 2000 when production would peak at 11,173 MT. Consumption of halon 1211 in new extinguishers would peak in 2001 at 8,666 MT. In both cases, these peaks are within the capacity of existing facilities that would remain after implementation of conversion and closure projects up to those years. In other words, the base case only considers financing of halon capacity installed before July 25, 1995. Moreover, because capital costs in the sector approach are based on per enterprise cost, these capital costs do not increase in the base case despite increased production of halon 1211 extinguishers.

(d) Sector approach additional savings. In addition to the MLF savings expected from an accelerated halon 1211 phaseout, China expects further savings from the sector plan's policy incentives (including the grant bidding scheme) which would encourage enterprises to phaseout in more cost effective ways. As potential costs, savings, and benefits are best known to the enterprises themselves, it is difficult if not impossible to estimate savings in advance. However, the sector plan funding request captures the savings by excluding any request for contingency. The project-by-project base case includes 10% contingency (as is the practice in current projects).

(e) Sensitivity to growth rate assumptions. The project-by-project approach costs are relatively insensitive to changes in the assumptions about rate of conversion vs. rate of growth. For example, if conversion before MP controls were to take place at a rate of 5% per year while halon extinguisher growth continued at 10% per year, the savings would increase to 29%. On the other hand, if conversion were to increase to 15% per year

[4] Exports and new system demands were assumed to be the same as under the sector approach.

with growth at zero the savings would be reduced to 23%. Thus, even if government control were successful under a project-by-project approach, a sector approach would still yield savings of over 20 percent by comparison.

3.0 HALON PHASEOUT COSTS RELATIVE TO OTHER SECTORS

1. The sector approach would save funds compared to a project-by-project approach. But putting the issue of savings aside, China's Sector Plan for halon Phaseout is one of the most cost effective proposals to be considered by the Fund. Through June 1996, the Multilateral Fund had financed projects that would, when complete, eliminate consumption of about 75,000 ODP tons with an average cost effectiveness of about $5.50/kg of ODP phased out. The proposed halon sector approach would add an additional 37,500 ODP tons of both production and consumption to the MLF portfolio at a cost effectiveness of less than $1.00/kg ODP. Table 2 below lists total cost effectiveness of the program and also provides the cost effectiveness for two of the programs largest cost components -- halon 1211 production closure and halon 1211 extinguisher manufacturer conversion.

Table 2: SECTOR PLAN FOR HALON PHASE OUT IN CHINA: COST EFFECTIVENESS

	Production Phased Out (ODP MT)	Consumption Phased Out (ODP MT)	Grant (US $ million)	Cost Effectiveness
Overall Sector Approach	37,350	29,150	$59.7 NPV	$0.90/kg ODP[5]
Closure Halon 1211	29,850		$14.9 NPV	$0.50/kg ODP[6]
Conversion Halon 1211 Extg. Plants		22,032	$19.4 NPV	$0.88/kg ODP[7]

[5] If the cost effectiveness is considered for the sum of present values for each year of the program ($87.9 million), the cost effectiveness would be $1.32/kg ODP.

[6] Cost effectiveness of sum of PVs ($19.7) would be $0.66/kg ODP.

[7] Cost effectiveness of sum of PVs ($22.9) would be $1.04/kg ODP.