



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF AIR AND RADIATION

Mr. Robert J. Russell
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Dear Mr. Russell:

Since last year we have received several letters from both you and Honeywell's attorney, Richard Ayers, of the Ayers Law Group. EPA has carefully reviewed Honeywell's request to convert CFC-11 to CFC-12 and has concluded that the Clean Air Act does not permit this conversion. Our analysis of your request is provided in the enclosure. The enclosure also briefly addresses the environmental issues associated with the proposed conversion.

Please contact Jeanne Briskin, Deputy Director of the Global Programs Division, at (202) 564-9135 if you require further assistance.

Sincerely,

Jeffrey Holmstead
Assistant Administrator

cc: Richard E. Ayres, Ayres Law Group

Enclosure

Enclosure

ANALYSIS OF HONEYWELL REQUEST TO CONVERT CFC-11 TO CFC-12

Introduction

Between April, 2001 and November, 2001 we received correspondence from Honeywell and its attorney regarding Honeywell's desire to convert CFC-11 to CFC-12. Following is a summary of correspondence received by Environmental Protection Agency (EPA) staff:

April 2, 2001: Letter from Mr. Robert Russell to Mr. Tom Land of the EPA seeking EPA approval of Honeywell's request to convert CFC-11 to CFC-12.

May 23, 2001: Email from Mr. Russell to Mr. Land.

June 20, 2001: Email from Mr. Russell to Ms. Jabeen Akhtar of the EPA.

August 2, 2001: Email from Mr. Russell to Ms. Akhtar.

November 30, 2001: Letter from Mr. Richard Ayres of Ayres Law Group to Administrator Whitman.

Through this correspondence, Honeywell described the proposed conversion process, set forth arguments in favor of the conversion, and requested that EPA determine whether the conversion was legal. Our analysis of Honeywell's proposed conversion appears below.

Summary

While Honeywell's proposed conversion of CFC-11 to CFC-12 appears to be permissible under the Montreal Protocol, it constitutes prohibited "production" under the CAA and EPA's implementing regulations. This conclusion is based on the plain language of the CAA and on interpretations that EPA has previously articulated in rulemaking.

The Montreal Protocol

Under the Montreal Protocol, Parties must ensure that their "calculated level of production" of chlorofluorocarbons (CFCs) "does not exceed zero." Art. 2A(4). "Production" is defined as "the amount of controlled substances produced, minus the amount destroyed by technologies to be approved by the Parties and minus the amount entirely used as feedstock in the manufacture of other chemicals. The amount recycled and reused is not to be considered as 'production.'" A Party's "calculated level" of production is determined in accordance with Article 3, which states that "each Party shall . . . determine its calculated levels of . . . [p]roduction by . . . multiplying its annual production of each controlled substance by the ozone depleting potential specified . . . [and] adding together . . . the resulting figures." Art. 3(a).

Thus, for purposes of the Montreal Protocol, a Party's calculated level of production is an annual amount, weighted accordingly to the ozone-depleting potential (ODP) of the various substances produced. As specified in the Montreal Protocol's definition of "production," Parties may offset amounts produced with amounts "entirely used as feedstock in the manufacture of other chemicals."

The April 2, 2001 letter regarding the proposed Honeywell conversion process indicates that a net decrease in CFC mass would result. In addition, both CFC-11 and CFC-12 have an ODP of 1.0. 40 CFR Part 82 Appendix A. As a result, the ODP weighted production of CFC-12 would be more than offset by the amount of CFC-11 used as feedstock. Therefore, it appears that the Honeywell process would not conflict with the U.S. obligation under the Montreal Protocol to ensure that its calculated level of production remains at zero.

The Clean Air Act

Under Section 604(b) of the CAA, it is “unlawful for any person to produce any amount of a class I substance.” While the prohibition in Section 604(b) of the Act is subject to certain exceptions, none of these exceptions applies to the conversion of one class I ozone-depleting substance (ODS) to another. See CAA 604(d). Therefore, EPA examined whether the conversion of one class I ODS to another constitutes “production” as defined under the CAA.

The Definition of “Production”

Section 601(11) of the CAA states that:

“[t]he terms “produce,” “produced,” and “production”, refer to the manufacture of a substance from any raw material or feedstock chemical, but such terms do not include -- (A) the manufacture of a substance that is used and entirely consumed (except for trace quantities) in the manufacture of other chemicals, or (B) the reuse or recycling of a substance.”

The conversion of CFC-11 to CFC-12 clearly involves the “manufacture” of a “substance” (CFC-12) subject to regulation under Title VI of the CAA. The CFC-11 is a “feedstock chemical” for the CFC-12. Thus, the conversion of CFC-11 to CFC-12 constitutes “the manufacture of a substance from any raw material or feedstock chemical.” The remaining issue is whether either of the exclusions in 601(11)(A) or (B) is available.¹

The Transformation Exclusion

The exclusion set forth in 601(11)(A) refers to a process known as “transformation.” See 40 CFR 82.3 (“*Transform* means to use and entirely consume (except for trace quantities) a controlled substance in the manufacture of other chemicals for commercial purposes.”)

In the proposed Honeywell conversion process, the CFC-12 would not be “used and entirely consumed (except for trace quantities) in the manufacture of other chemicals.” Honeywell’s letter of April 2, 2001, suggests that it intends to sell the CFC-12 for use in motor vehicle air conditioners. It apparently has no plans to use it in the manufacture of other

¹ EPA’s regulations recognize two additional exclusions, for “[a]mounts that are destroyed by the approved technologies” and “[a]mounts that are spilled or vented unintentionally.” Since neither of these exclusions has been raised in this context, we will not discuss them further here.

chemicals. Therefore, the transformation exclusion does not apply to Honeywell's manufacture of CFC-12.

Additional support for this conclusion appears in the legislative history of Title VI of the CAA. The transformation exclusion is described in the Statement of Senate Managers as follows: "This provision is necessary because some of the substances covered by this new title are feedstocks for other important substances. The provision is environmentally benign because it only extends to controlled substances that are used in a fashion that eliminates both the threat of release to the environment and the ozone destroying properties of these substances." Chafee-Baucus Statement of Senate Managers, S. 1630, The Clean Air Act Amendments of 1990, (103d Cong., 1st Sess., 1993) ("Statement of Senate Managers"). Here, the CFC-12 will not be used as a feedstock. Its use in motor vehicle air conditioners will not eliminate the threat of its release to the environment, as leakage will occur. Nor will such use eliminate its ozone destroying properties. Thus, Congress clearly did not intend the transformation exclusion to apply to manufacture of CFCs for use in motor vehicle air conditioners.

Another consideration is that prior to the production ban, some ODS were typically produced through the use of a different ODS as feedstock. For example, carbon tetrachloride, a class I ODS, was routinely used as a feedstock in the production of CFC-12. Carbon tetrachloride is still manufactured today for use as a feedstock for non-ODS. Manufacture of carbon tetrachloride for use as a feedstock qualifies for the transformation exclusion because the carbon tetrachloride is "used and entirely consumed (except for trace quantities) in the manufacture of other chemicals." However, conversion of carbon tetrachloride to CFC-12 for use in motor vehicle air conditioning would constitute "production" of CFC-12, and accordingly is prohibited.

Here, the CFC-11 would be "used and entirely consumed (except for trace quantities)" in the manufacture of another chemical, namely CFC-12. Thus, if CFC-11 were to be manufactured for use in this process, the manufacture of the CFC-11 would qualify for the transformation exclusion. However, the question here is whether the manufacture of the CFC-12 would qualify for the transformation exclusion. The manufacture of CFC-12 would not qualify for the transformation exclusion because the CFC-12 would not be "used and entirely consumed (except for trace quantities)" in the manufacture of another chemical.

The Reuse/Recycling Exclusion

The exclusion set forth in 601(11)(A) provides that "the reuse or recycling of a substance" is not "production." The terms "reuse" and "recycling" are not defined in the CAA. As discussed below, EPA interprets "reuse" as applying, for example, where a refrigerant is used in refrigeration equipment, removed from that equipment, and subsequently used in other refrigeration equipment. EPA interprets "recycling" as referring to the cleaning of a substance that was previously used in preparation for reuse, with no change to the chemical nature of the substance. Neither concept applies to the conversion of CFC-11 to CFC-12.

While EPA's regulations do not contain a definition of the term "reuse," they define

“used controlled substances” as “controlled substances that have been recovered from their intended use systems (may include controlled substances that have been, or may be subsequently, recycled or reclaimed).” 40 CFR 82.3. Thus, a “reused” controlled substance is a substance that has been recovered from its intended use system (e.g., refrigeration equipment) and thereafter returned to such a use system. A “reused” substance may or may not be “recycled.”

The Statement of Senate Managers describes the reuse/recycling exclusion as follows:

“[t]he Senate bill, the House amendment and the conference agreement define ‘production’ to exclude the manufacture of a controlled substance that is recycled or reused. This provision is designed to avoid the problem of double counting, i.e., forcing a producer to use production allowances when the producer is simply reprocessing a previously produced and used substance. If the producer increases the amount of such substance, however, such increased amount will count as new production.

This provision is also designed to allow reprocessing of previously, legally produced substances after the ultimate phase-out date for production of such substances. This provision does not, however, exclude from the production controls and ultimate prohibitions a substance that is produced with the intent to eventually reuse or recycle it. All new production falls outside the scope of the “reuse/recycle” exclusion.” - - Chafee-Baucus Statement of Senate Managers, S. 1630, The Clean Air Act Amendments of 1990, Definitions – New Section 601.

There is no indication in the passage quoted above that Congress intended the exclusion to apply to conversion of one substance to another. The passage describes the exclusion as applying to the “reprocessing” of a “previously produced and used substance.” As reflected in EPA’s refrigerant recycling regulations, such “reprocessing” occurs when an ODS has become contaminated through use and is cleaned prior to reuse.

The concept of reprocessing plays a significant role in the refrigerant recycling regulations, 40 CFR part 82 subpart F. There, EPA uses the terms “recycle” and “reclaim” to denote two levels of reprocessing. The term “recycling” as used in the CAA encompasses both levels. See 58 FR 28671 (May 14, 1993). Under the regulations, “[r]ecycle refrigerant means to extract refrigerant from an appliance and clean refrigerant for reuse without meeting all of the requirements for reclamation. . . .,” and “[r]eclaim refrigerant means to reprocess refrigerant to at least the purity specified in appendix A to 40 CFR part 82, subpart F . . . and to verify this purity using the analytical methodology prescribed in appendix A. . . .” 40 CFR 82.152. “The key difference between ‘recycle’ and ‘reclaim’ is that the former does not involve chemical analysis of the product.” 58 FR 28671-28672. Both terms are fundamentally associated with the cleaning of a substance (i.e., the removal of impurities from a substance). See 61 FR 7858 (Feb. 29, 1996) (“reclamation means that the refrigerant has been cleaned and chemically analyzed for conformity with the ARI Standard 700-1993 purity levels”). In contrast, the conversion of one CFC to another is a wholly distinct concept. Instead of increasing the purity of the CFC-11, the conversion process results in a different chemical substance.

In addition, the passage from the legislative history makes clear that the exclusion cannot be applied to the manufacture of the CFC-12 on the ground that the CFC-12 may be reused or recycled at some point in the future. It specifically states that the exclusion is not available where a substance is manufactured “with the intent to eventually reuse or recycle it.”

Furthermore, the passage categorically states that “[a]ll new production falls outside the scope of the ‘reuse/recycle’ exclusion.” The conversion of CFC-11 to CFC-12 would create a “new” substance, namely the CFC-12. Thus, it falls outside the scope of the reuse/recycling exclusion.

It is worth noting that the planned conversion of CFC-11 to CFC-12 would not constitute “recycling and reuse” under the Montreal Protocol. In Decision IV/24, the Parties to the Montreal Protocol clarified that the term “recycling” meant “[t]he re-use of a recovered controlled substance following a basic cleaning process such as filtering and drying.” Dec. IV/24, ¶ 3(b). Conversion of CFC-11 to CFC-12 cannot be achieved through a “basic cleaning process,” but rather involves a chemical change to the CFC-11. Similarly, Decision IV/24 defines “reclamation” as “[t]he re-processing and upgrading of a recovered controlled substance through such mechanisms as filtering, drying, distillation and chemical treatment in order to restore the substance to a specified standard of performance.” Dec. IV/24, ¶ 3(c) (emphasis added). Conversion of CFC-11 to CFC-12 has nothing to do with “restoration” of the existing CFC-11.

It is our understanding that Honeywell would convert stocks of virgin (i.e., never used) CFC-11. This clearly would not constitute “reuse” or “recycling,” because both terms assume a previous use. Even if Honeywell were to convert used rather than virgin CFC-11, the used CFC-11 would not be cleaned in preparation for a subsequent use as CFC-11, but rather would be converted into a new substance. Thus, the proposed Honeywell conversion does not qualify for the reuse/recycling exclusion.

In addition, it is unlikely that the reuse/recycling exclusion was designed to apply to the same set of facts as the transformation exclusion. Because Congress took the trouble of creating a separate exclusion for reuse/recycling, that exclusion must have some independent meaning. The conversion of CFC-11 to CFC-12 constitutes “transformation” of the CFC-11 (though not of the CFC-12). Thus, such conversion cannot constitute “reuse” or “recycling” of the CFC-11.

Offsets

Because the Montreal Protocol appears to permit the conversion of one CFC to another if the ODP weighted mass of the output is less than or equal to the ODP weighted mass of the input, the question arises whether the CAA would permit conversion under the same conditions. Another way of stating this question is whether the CAA allows the production of one substance to be offset by the transformation of a different substance. EPA’s longstanding position on this issue has been that “[a]lthough the definition of production in the Protocol would permit continued production beyond the phase out as long as such production was offset by transformation or destruction, the definition of production under the Clean Air Act Amendments

is distinct and does not permit such offsetting.” 59 FR 56276, 56279 (November 10, 1994). See CAA 614(b) (“In the case of conflict between any provision of this title [Title VI of the CAA] and any provision of the Montreal Protocol, the more stringent provision shall govern.”)

This question arose in the context of the May 10, 1995 amendments to the phase out regulations. 60 FR 24970. In those amendments, EPA clarified the rules that would apply following the impending January 1, 1996 phase out of CFC production under the Montreal Protocol and EPA regulations. The CAA contained a different CFC phase out date: January 1, 2000. The difference in phase out dates existed because of changes to the Montreal Protocol that occurred subsequent to the enactment of the Clean Air Act Amendments of 1990.

In 1990, the Parties to the Montreal Protocol agreed to a total phase out of CFC production beginning January 1, 2000. Congress established a January 1, 2000 production phase out in the Clean Air Act Amendments of 1990. However, in section 606, Congress gave EPA authority to promulgate regulations containing a more stringent schedule to reflect any acceleration of the schedule under the Montreal Protocol. § 606(a)(3). In 1992, the Parties to the Montreal Protocol agreed to change the date of the CFC production phase out from January 1, 2000 to January 1, 1996. Using its authority under section 606, EPA issued regulations establishing a January 1, 1996 CFC phase out date. 58 FR 65018 (Dec. 10, 1993). In the May 10, 1995 rulemaking, EPA considered whether the rules for the post-phase out era established in that rulemaking could continue beyond the statutory phase out date in the year 2000, or whether the statutory phase out might be different in stringency than the phase out that had been established under the Montreal Protocol and that was reflected in EPA’s regulations.

In particular, EPA proposed a system of “transformation credits,” which would be available beginning January 1, 1996. The proposed system would enable a company that transformed a set amount of a CFC to produce an equal amount of that CFC, minus a 15 percent offset, in spite of the production ban. However, the transformation credit would only be allowed if the substance transformed had originally been manufactured for an emissive use and not for transformation. 40 CFR 82.9(f); 59 FR 56279-56282 (Nov. 10, 1994). EPA compared the definitions of “production” under the Montreal Protocol and the CAA, and concluded that “the CAA definition of production is more stringent than that of the Protocol.” Because it viewed the CAA definition of production as not allowing offsets, EPA proposed “to authorize the use of destruction/transformation credits until . . . the terms of the CAA become more stringent than those of the Protocol.” 59 FR 56279. EPA did not receive any comments challenging its interpretation of the CAA on this point. 60 FR 24973. Therefore, in the final rule, EPA promulgated a system of transformation credits that would go into effect on January 1, 1996, but that would cease to be effective on January 1, 2000. 60 FR 24995; 40 CR 82.9(f).

Thus, EPA’s long-standing interpretation of the CAA is that the CAA does not permit production to be offset by transformation. As stated in the May 10, 1995 rulemaking, there are clear differences between the Montreal Protocol and the CAA in regard to the concept of “production.” While the Protocol directs Parties to calculate production on an annual, ODP-weighted basis, subtracting quantities destroyed or used as feedstock from quantities produced, the CAA, in contrast, simply states that “it shall be unlawful for any person to produce any

amount of a class I substance.” Section 604(b) (emphasis added). This emphasis on substance-by-substance accounting is further reinforced by the CAA’s reporting provisions, which require each person who produces an ODS to file a report “setting forth the amount of the substance that such person produced.” Section 603(b).

In addition, EPA has previously rejected the view that the CAA production phase out applies only to CFCs as a group, and not to individual CFCs. In an early rulemaking implementing Title VI of the Clean Air Act Amendments of 1990, EPA noted that Title VI differed “in several important respects” from EPA’s pre-1990 regulations, which had been “created by EPA to implement the Montreal Protocol.” One such difference was that “section 604 makes the production limits applicable to each substance separately, not to groups of substances as in the [pre-1990] regulations.” 56 FR 9518, 9520 (March 6, 1991).

In an e-mail dated May 23, 2001, from Robert Russell to Tom Land, Honeywell offered to partially offset the manufacture of CFC-12 from CFC-11 by reducing its future European production quantity of CFCs for developing countries. Under the Montreal Protocol, developed countries may produce limited amounts of CFCs for export to developing countries. See Art. 2A(4). A similar exemption is available under section 604(e) of the CAA. However, such production rights exist for the very specific purpose of meeting the basic domestic needs of developing countries during the phase out period in those countries. Honeywell has not pointed to any authority that would allow it to exchange the right to manufacture CFCs for use in developing countries for the right to manufacture CFCs for the U.S. market. Indeed, the Montreal Protocol grants the right to produce to a specific country rather than to a specific firm. Finally, and consistent with that notion, we understand that Honeywell has already reached an agreement with the government of the Netherlands that would, from 2003 on, strictly limit the amount of CFCs that Honeywell may produce for basic domestic needs for developing countries to the absolute minimum amount possible to enable it to continue to produce CFCs for metered dose inhalers. (October 1, 2001 letter from J.P. Pronk, Ministry of Housing, Spatial Planning and the Environment, the Netherlands, to the Chairman of the Lower House of the States General, the Netherlands, and the Directorate General for Environmental Management, Department for Climate Change and Industry, EU). While we appreciate this agreement between Honeywell and the Netherlands, the proposal to offset production does not alter our conclusion that the CAA prohibits Honeywell’s conversion of CFC-11 to CFC-12.

In summary, Honeywell may not convert any quantity of CFC-11 to CFC-12, due to the specific requirements of the CAA.

Environmental Impact

In addition, we evaluated the potential environmental impact of the proposed conversion. Although, on a molecular basis, the ODP of the stock of CFC-11 converted to CFC-12 would be reduced by 12%, the overall impact on the stratospheric ozone layer of the converted material would be greater than if the CFC-11 were not converted. This is because of the currently expected fate of the CFC-11 in the absence of conversion..

Typically, CFC-11 is destroyed in RCRA permitted incinerators when no longer stored or in use. The incineration process not only destroys the CFCs, but also removes all of its ODP. Although the current mass of CFC-11 destroyed each year compared to the total stock of CFC-11 in use and in storage in the U.S. is small, we estimate that after about 22 years at the current rate of destruction, the long-term environmental benefits of destruction will outweigh the shorter term benefits of conversion. For context, decisions regarding ODSs are typically made with a time horizon of approximately 40 years (the time between the legal and policy decision to ban production of CFCs and the final date after which production of HCFCs (the common replacements for CFCs that also have some ODP) is banned).

In addition, timing and certainty of release of the potential CFC-12 resulting from the conversion of the CFC-11 in question is of greater concern to the ozone layer compared to the CFC-11 starting material. CFC-11 is used in equipment which is sealed, and not inherently leaky. Even if the vessel or equipment containing CFC-11 were to leak, CFC-11 is a liquid under normal conditions, and would not immediately be released to the atmosphere. In contrast, the converted CFC-12 is expected to be used in automobile air conditioners. This type of equipment is unsealed and leakage of the refrigerant is a normal occurrence. CFC-12 is a gas under normal circumstances, so that leaks are not only expected, but are also quickly released to the atmosphere .

Note that it is currently technically possible and legally permissible to convert CFC-11 to non-ODP substances.

Thus, keeping to the path of business as usual in storage, handling, and destruction of CFC-11 is expected to provide a much greater overall benefit to the ozone layer than the proposed conversion.