



Concept Paper: Emission Reduction Banking and Trading Systems

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Concept Paper: Emission Reduction Banking and Trading Systems

Preface

This concept paper was prepared for the U S Environmental Protection Agency by ICF Incorporated under contract 68-01-5908. The purpose of this paper is to explore the concept of emission reduction banking and trading, especially issues relating to operational, administrative, and policy options. In addition, under this same contract, ICF Incorporated is preparing four manuals describing how to set up alternative banking and trading programs. This paper and the four subsequent manuals were prepared by a project team including Paul Bailey (Project Manager), David Bruce, and Steve Seidel.

The views expressed in this paper do not necessarily represent the official policy of the United States Environmental Protection Agency.

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Key Concepts of Emission Reduction Banking and Trading Systems

Analogies and Precedents for Pollution Rights Banking and Trading

The first section of this paper highlights key concepts and terms critical to an understanding of our approach to the design of banking and trading systems. Also included in this section is an overview of the five components which comprise a banking and trading system. Specific topics examined in this section include:

- A discussion of analogies and precedents for banking and trading systems
- A definition of the commodity—emission reduction credits—what is actually banked and traded, and how it relates to the initial reduction of emissions by a source.
- An overview of the five components in a banking and trading system
- A comparison of the different uses of the term "banking"

Although it is acceptable to speak colloquially of the banking and trading of "Emission Reductions", it is important to recognize that what is of *marketable value* are the *rights* connected with or resulting from an emission reduction. A buyer would want those rights to use as new source offsets or for a more cost-efficient satisfaction of emission limitations (i.e., application of the "bubble"). How do we categorize these rights? Broadly, they are a right to credit emission reductions against an emission limit requirement. More specifically and operationally, they are the right to have one's permit adjusted (or established, in the case of a new source). The nature and characteristics of the commodity or right created by banking and trading systems will determine the success of those systems. If the right is not *marketable*, the systems will fail.

While this may sound like terminological hair-splitting, it is not. Before "investing in" (e.g., creating) emission reductions for banking and trading purposes, potential sellers will want to know (1) the expected economic value they could get for their investment and (2) possible legal problems affecting marketability (and hence, the return on investment).

Potential buyers will likewise need engineering and financial analysis to determine the value to them, as well as legal counsel regarding possible pitfalls. The air pollution control agency will want to know what effect these systems will have on their administrative workload and their budget, and how these systems will affect the achievement of ambient air quality standards. In addition, speculators, conservationists, and others may want to participate in the market. All of these actors will want and need to know

- What is the nature of the commodity being traded?
- How does it affect their rights and obligations?
- What incentives/disincentives will result?

Economic literature describing the concept of a market for pollution rights generally discusses the theoretical merits of such markets in terms of economic efficiency (cost-effectiveness and resource allocation)

However, little attention is given to more practical issues. In some cases,¹ analogies to the markets for taxi medallions, offshore oil drilling rights on federal land, and liquor licenses are made. Other possible analogies could include state turnpike restaurant concessions, mineral land leases, water rights in Western states, transportation route certificates (CAB, ICC), hospital certificates of necessity, and broadcasting licenses. In all of these "public franchise" situations, there are government regulations concerning transferability of rights to other parties and related issues.

These precedents and analogies can be misleading. In particular, it should be stressed that the proposed emission reduction banking and trading systems differ from existing precedents and economic models of marketable pollution permits in one very important feature: it is *not* the administrative permits themselves that are to be banked and traded. Rather, the commodity consists of the "right" to have one's permit adjusted (or issued, in the case of new sources) based on a prior or contemporaneous emission reduction certified by the air pollution control agency.

The marketable pollution permit systems described in the economic literature concern (i) the initial

¹See, e.g., de Lucia, *An Evaluation of Marketable Efficient Permit Systems* (Meta Systems, Inc., 1974).

Defining the Commodity: Emission Reductions and Emission Reduction Credits

allocation, and (ii) rules for subsequent trading of pollution permits. Likewise, the official rules (if any) regulating the transfer of oil drilling rights, taxi medallions, liquor licenses, turnpike concessions, transportation route certificates, hospital certificates, and broadcasting licenses all concern the transfer of the *entire package of rights* included in the "franchise." On the other hand, the notion of *marginal* cost-effectiveness underlies the concept of emission *reduction* banking and trading. Except where emission reductions are created by the *complete* shutdown of a source (i.e., emission elimination), the seller is transferring—in *effect*—only a *part* of his permit to the buyer. Moreover, the rules of banking and trading will operate to reduce somewhat the pollution rights transferred. For example, even the shutdown of a source emitting 100 tons of a pollutant will not enable the buyer to increase his emissions by that full amount. Finally, in no meaningful sense can we claim that the permit itself is being traded; emissions permits are *source specific* and *non-transferable*.

In conclusion, it is essential that a clear idea of the commodity created for emission reduction banking and trading systems be communicated in the information manuals and other marketing and technical assistance efforts. In the next section, we describe that commodity as "emission reduction credits" and explain its relationship to pollutant emission reductions and the permit process.

Exhibit 1 presents an overview of the process by which emission reductions become amenable to banking and trading. The process has five components: (1) creation of an emissions reduction, (2) confirmation of the reduction and permit modification; (3) certification and registration of emission reduction credits, (4) "banking", storage, and trading; and (5) subsequent modification of permits. The five components represented in the flow chart will be described in more detail in Part II of this concept paper. Here, we want to draw an important distinction between two major concepts: (1) emission reductions and (2) emission reduction credits.

In thinking through how a banking and trading system would function operationally, we found it necessary to

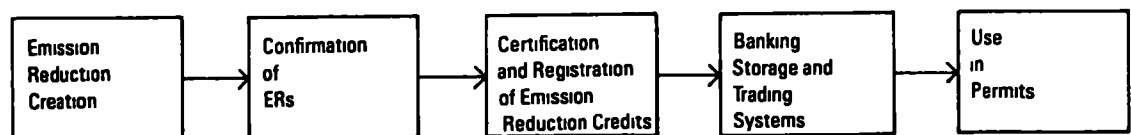
distinguish between the physical reduction of emissions by a source and the commodity that is to be banked and/or traded. The two are not identical. As we discuss below in Part II, the use of "taxes" to either finance the system or create a public reserve, "discounts" to reflect changes in SIP's, or other "adjustments", as well as the offset ratio which may be required to satisfy the "demonstration of attainment" requirement, means that *while actual source emissions may be reduced, for example, 100 tons of a pollutant, only 80 of these tons may be available for banking and trading*. In order to avoid confusion between the physical pollution units and the intangible pollution "rights" which are banked and traded, we call the

latter "emission reduction credits."

The permit system is the administrative mechanism through which emission reduction credits can be created and used. This is shown in Exhibit 2. Emission reduction credits may be *created* by a source through the use of the permit system. A source may apply to change its permits in the direction of *lower* emission limits by installing controls, altering operating parameters and inputs, suspending operations, etc., so as to reduce emissions below the existing baseline level of emissions. *Reductions of emissions below the baseline amount are eligible for conversion into emission reduction credits*. Once emission reductions below the baseline are documented, the

Exhibit 1

Overview of Components of Banking and Trading Systems



The Banking and Trading of Emission Reduction Credits

source is bound to the new, lower baseline, but is free to "bank", use, or trade the emission reduction credits in a manner consistent with applicable rules. Emission reduction credits may be *used* by being converted back into

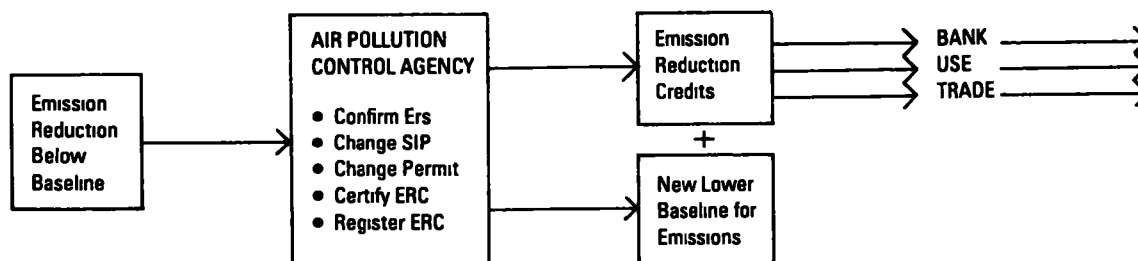
physical pollution units through the permit system in a manner consistent with other requirements (e.g., new sources, bubble). Conversion of the ERC's into an emissions allowance in a permit extinguishes the emission reduction credits. Thus, while

there is a close relationship between emission reductions and emission reduction credits, the two are different in function and amount. Conversion must take place by using the permit and certification system.

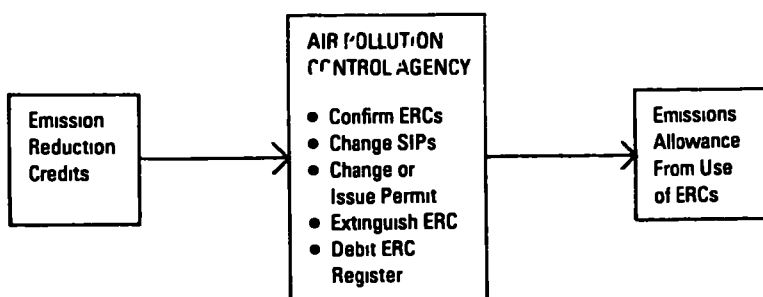
It is helpful to distinguish the five components of this process displayed in the Exhibit 1 flowchart. The first component represents the physical reduction of pollutant emissions from a source. The source always has the option of using controls and other means of voluntarily emitting lower levels of pollution than currently allowed under its permit. This preserves the right of that source to return, at any time, to the higher actual levels of emissions authorized by its permit. This can be done without the approval or even knowledge of pollution control authorities. However, the transfer or reallocation of pollution rights between and among sources (i.e., banking and trading) requires

Exhibit 2

(I) How Emission Reductions (ERs) Can Be Converted into Emission Reduction Credits (ERCs)



(II) How Emission Reduction Credits Can Be Converted Back into Allowable Emissions



- the confirmation of the emission reductions by the air pollution control agency and the modification of source permits,

- the certification and registration of emission reduction credits;

- "banking" and trading according to the rules of the system established, and

- modification of the permits of transferee and transferor and the extinguishment of the credit

Use of the Term "Banking"

These requirements are described in detail in the following parts of this paper

In conclusion, the commodity which can be sold or transferred by a source is an "emission reduction credit" which entitles the owner to the modification of emission permits. The permit documents themselves are not the commodity.¹

The term "emission reduction credit" is useful and descriptive. Moreover, the term signals the fact that the commodity traded—a "credit"—is embedded in the context of the permit process of a SIP. The term also suggests that the "credit" necessarily is based on a definable emission reduction and it sounds more positive than "pollution rights" (a very misleading expression).

¹This distinguishes the proposed system from other "marketable pollution permit" ideas, e.g., de Lucia, *An Evaluation of Marketable Effluent Permit Systems*, (Meta Systems, Inc., 1974)

Throughout the development of this paper, we have been concerned with the "correct" use of the term "banking". In general, we use the phrase "banking and trading system" to describe the mechanism by which aspects of the offset and bubble policies can be effectuated. However, we recognize that these terms are not always used consistently in the literature and that confusion—both conceptual and terminological—cannot be eliminated by fiat. Nevertheless, it is important that we distinguish and be aware of several possible uses of the term.

Four broad usages of the term can be distinguished:

- the *activity* of "banking" an emission reduction,
- the *status* of emission reductions as "banked",
- the *collection* of emission reductions in a "bank repository", and
- the *agency and body* involved, the "bank".

These uses are relatively easy to describe in the abstract

The activity of "banking" emission reductions: In our formulation, this is equivalent to the activity of applying for a permit change and an emissions reduction credit. The use of the term "credit" suggests the commonly understood notion of having deposits in a commercial financial bank. Synonyms could include "storing" and "depositing".

The status of emission reductions as "banked": Again, this suggests the common idea of demand deposits in commercial financial institutions. While the depositor retains ownership of the banked emission reductions, custody and control are out of his hands.

The collection of certificated emission reductions: In this usage, the bank comprises the store or pool or stock of emission reductions that have been certificated and registered. The registry serves as an index of what is in the bank. The certificate is the evidence of deposit ownership and may be traded or transferred as allowed.

The agency or body that issues emission reduction credits: In this usage, the term bank refers to an institution and the procedures used for making sure the system works. We have avoided this use by employing such terms as "public authority", "public body", and the like.

Complications enter during the banking and trading phase. Because the systems (e.g., public auction, monopoly/monopsony, private trade) have different critical features, the four common usages of the "banking" concept undergo changes in the context of each system.

Consider, for example, the public auction option. As the agency or body conducting the auction, the "bank" can either buy emission reduction credits outright or accept them for auction on *consignment*. In the former instance, it owns the credits; in the latter instances, it acts as a selling *agent* for the actual owners of the credits. In both instances, the emission reductions seem to be "banked". However, the producer cannot "withdraw" any emission reduction credits that the bank has purchased outright. The emission reduction credits consigned to the public body are analogous to bank deposits, but the ones sold directly to the public body have a different status.

Banking and Trading System Components

Component 1: Creating Emission Reductions

Similarly, calling the public body a "bank" does not distinguish its possible different roles as (1) repository, (2) consignee for sales, (3) purchaser for later disposition, (4) sole sales outlet under the monopoly/monopsony option, and (5) clearinghouse or broker. We have tried to use these more explicit terms in the body of this paper.

One final point should be raised. The focus of this paper is on banking *and* trading systems. It is the trading aspect that will be particularly difficult to implement. What we mean by "trading" is the transfer of emission reduction credits from one legal person to another. We have not explicitly addressed the case where one person wishes to create and transfer emission reduction credits among its sources; in this instance, there is no trading per se, but there is banking for future use and the modification of source permits. For example, in the Louisville emission reduction bank to date, withdrawals have been limited to firms drawing against their own deposits. If this is expected to be the more common pattern, it may be preferable to develop one manual concerning banking and three separate manuals concerning banking and trading.

In this section, we describe five components of an emissions reduction banking and trading system and the issues raised in each component.

Creating Emission Reductions (ERs)

- What are the different ways of producing an ER?
- What restrictions should be placed on producer eligibility?

Confirmation and Permitting of Emission Reductions

- How can ERs be confirmed?
- How can the permanency of ERs be assured?
- How should administrative costs be financed?

Certifying Emission Reduction Credits (ERCs)

- How should producers of ERCs be classified?
- How should sources be classified?
- By what process are ERs converted into ERCs?
- How are ERCs to be accounted for?

The Holding, Sale, or Transfer of ERCs

- How should buyers be classified?
- What requirements should guide the actual transfer process?

Permit Modification After Sale

- How should ownership of ERCs be confirmed?
- In what regulatory contexts may ERCs be applied?
- Are the ERCs of the appropriate characteristics for the source seeking to use them?
- What permit modifications are necessary?

These issues are discussed in the following sections. In Part III of this paper, we focus on the components and structures of alternate models of banking and trading exclusively.

The initial component of a banking and trading system involves the creation of emission reductions (ERs). It is the first step in the production of the commodity—emission reduction credits (ERCs)—which ultimately will be banked and traded.

The principal goal in setting up rules for this component of the process is to maximize production of emission reductions. At the same time, other factors including equity, administrative necessity, and economic efficiency must also be considered to ensure the viability of a banking and trading system and the achievement of its desired goals. Specific issues which arise in the context of this initial component include:

- What are the different ways of producing an ER?
- What restrictions should be placed on producer eligibility?

What Are the Different Ways of Producing an ER?

A source creates an ER by lowering its emissions below a definite baseline (e.g., the amount actually emitted). This reduction can be accomplished in a number of ways. A plant could shutdown existing facilities, cutback its operations, alter its production processes, or add abatement equipment. *For each source seeking to create an emission reduction, there must be a definite baseline against which to measure the reduction.* Absent such a baseline, enforcement problems arise because there is no way to tell whether the current "reduced" emission level is sufficiently below the previous unspecified higher level to accurately account for the ER allegedly created. In some situations, a source may not be subject to a permit (e.g., a minor source or a source in a state without a permitting system) or the terms of the permit may not specify a definite level of emissions (e.g., the permit specifies operating procedures,

work practices, operation of equipment, etc.) or the permit may not reflect existing emissions at the time the SIP design value was calculated. To determine the baseline in these situations, some form of engineering analysis, monitoring, or other form of audit is required. Because emission reductions must be *real, permanent, and enforceable*, the establishment of before and after baselines is an important function.

In terms of improved air quality, the origin of the ER is of little concern. Although a banking and trading system will lead to emission reductions that improve air quality, at least temporarily, it may also take into account effects on employment and economic development in the area. For this reason, it may be desirable to differentiate among the various ways in which an ER is produced. Operationally, differing incentives to reduce emissions could be incorporated into the system by varying the percentage of ERCs awarded for the production of ERs on the basis of the method in which they were created. For example,

- Awarding ERCs for a plant or source shutdown would create an incentive (i.e., profit

from the sale of the ERC) for this action; the award of ERCs for reductions produced in this manner could be restricted. Of course, prohibiting such reductions could create perverse incentives to continue use of polluting facilities rather than shutting them down.

- It may be desirable to create an incentive for the use of innovative technologies as the means of producing an ER. Bonus ERCs could be issued to encourage this method of reducing pollution.

The use of ERC certification as an incentive device to affect the manner in which actual emissions are reduced will be discussed in greater detail in Component 3, "Certifying Emission Reduction Credits". *From the standpoint of a state or local air pollution control agency, it may be desirable to first adopt a straightforward banking and trading system with relatively few complicated rules or exceptions.* Refinements such as those discussed throughout this paper may be added later at the discretion of the controlling agency.

An additional method of discouraging the creation of certain types of ERs would be to limit the context (e.g., new vs. expanding source) in which they can be used on the basis of the manner in which the ER

was created. For example, ERs created by a plant or source shutdown would be limited to use by the same firm in opening a new facility. Limits on user (buyer) eligibility will be discussed in "The Holding, Sale, or Transfer of ERCs."

One final point related to the creation of ERs is that many sources may now have actual emission levels which are below that specified in their permits, if any. This situation may exist because pollution control equipment operates in a step-wise (and not incremental) manner to control emissions or because of the costs of inputs (e.g., in the West, low sulfur coal is relatively inexpensive). In effect, these sources may have "paper" ERs; the question is can they have them certified in order to bank and trade them? If this is allowed, and their ERs are ultimately bought and used, air quality could actually deteriorate. To guard against this occurrence, states must be sure that credits are given only for sources that make real reductions that have not already been accounted for in a demonstration of attainment. If the SIPs were developed in such a way that allowing pre-existing ERs to be credited would interfere with "reasonable further progress" or attainment, it will be necessary to limit a source's ability to cash-in on "pre-existing" ERs. This could be accomplished by limiting the award of ERCs only to reductions in "actual" and not "allowable" emissions.

Component 2: Confirmation of Emission Reductions

What Restrictions Should Be Placed On Producer Eligibility?

Any source can create an emission reduction. As suggested earlier, there may be legitimate reasons for restricting which sources can participate in a banking and trading system. This would be accomplished by not certifying a source's ER or by only certifying a percentage of them as ERCs. Situations in which restrictions may be placed on producer eligibility include:

- where a source is purchased for the purpose of obtaining ERs by closing the facility;
- where a source is marginal or where it is obsolete and likely to be shutdown for economic reasons in the near future; and
- where the source seeking to create ERs owns other facilities which are not in compliance

The actual restrictions placed on sources would occur at the time a source goes before the governing body to have the ERs certified as ERCs. This process will be discussed in detail in "Certifying Emission Reduction Credits". *At this juncture, it is important that all sources are aware that restrictions may be placed on having their ERs certified as ERCs.* This could be accomplished by making available to all sources explicit guidelines describing the conditions and restrictions on certification of emission reductions.

After an ER is created, but before it can be banked or traded, it must be entered in the records of the air pollution control agency (APCA). The creation and magnitude of the ER must be confirmed, and the source's permit and the SIP must be altered to reflect this change.

To the extent practicable, these administrative steps should be incorporated into on-going agency activities. Some states have developed inventories of existing sources and currently have under permit most, if not all, major stationary sources. States have also developed approved SIPs which include emissions limitations for each major stationary source, and most importantly, have programs to enforce these requirements. The effectiveness of state and local APCAs in implementing these existing programs (e.g., the reliability of data in inventories and permits, the certainty of enforcement, etc.) varies considerably across states. These administrative systems may have to be strengthened in order to insure the integrity of the banking and trading system. Where sources are not under permits, the APCA will have greater difficulty in determining the appropriate baseline against which emission reductions can be evaluated.

The primary function of the confirmation and permitting component of a banking and trading system is to officially incorporate newly created ERs into the SIP through the permitting system. The change in a permit would also provide an administrative record which

would clearly identify the ownership, quantity, and characteristics of emission reductions. The principal issue which must be addressed in designing this component include

- How can ERs be confirmed?
- How can the permanency of ERs be assured?
- How should administrative costs be financed?

How Can ERs be Confirmed?

As part of the process to develop and implement their SIPs, most states have compiled an inventory of the major sources of emissions located within their jurisdiction. These inventories typically list the facility, point sources within the facility, applicable emission standards for each point source, and the pounds of pollutant each emits.

Most sources in an inventory are also included within the state's permitting system. Pollution control permits have, within the past decade, been issued by some states for all new major sources of pollution. Existing sources have also been brought within the permitting system at the time they installed pollution control equipment or when complaints or inspections brought them to the attention of the APCA.

Permits typically include more detailed information about a source than that found on an inventory (e.g., compliance method and timetable and operating characteristics). They also tend

to be more up to date than the inventory, but may not be as comprehensive in the number of sources recorded.

The existing inventory and permitting systems provide an excellent starting point for determining the types of ERs which should be certified. Emissions found on the inventory and specified in a permit go into developing the SIP and therefore are included as part of the state's strategy to comply with ambient air quality standards. Any real reduction below the existing emissions would represent an improvement in air quality and thus qualify as an ER. However, reductions that affect permitted or allowable levels but not actual emissions would not be an improvement in air quality. Consequently, their acceptance as ERCs and use in permit applications would be in conflict with maintaining the SIPs' approvability. Consequently, while a useful starting point, relying on state inventory and permitting systems as the basis for certifying ERs has its limits. There are several potentially significant problems.

Nonconventional Sources: A large quantity of certain pollutants (e.g., particulates, hydrocarbons) are the result of nonpoint sources including roadways, construction sites, etc. These pollutants are difficult to control, but more importantly from the standpoint of an agency confirming a reduction in emissions, they are difficult to measure. Traditional forms of measurement such as

engineering analysis and stack tests are inapplicable. Without the ability to clearly measure current emissions and the level of proposed abatement, any award of ERCs to the source would be arbitrary. Yet reductions from these sources clearly do result in improved air quality, may be relatively cost effective to achieve, and may be essential to achieving ambient air quality standards.

Because it may be desirable to incorporate this form of abatement into the banking and trading system, some technique to confirm the creation and amount of a reduction should be developed. Possible methods to treat nonconventional sources include: only ERs which result from permanent changes would be permitted, the quantity of ERs would be determined by engineering analysis or ambient air monitoring at the property line before and after improvements are made, or to offset the uncertainty inherent in the creation of this type of ER, only a percentage of the ERs claimed would be certified as ERCs or the use of this form of ER could be limited to similar circumstances at the facility of the buyer.

In treating non-conventional sources and minor sources it may be useful to apply an incremental approach to these sources' incorporation into the banking and trading system. For example, as the banking and trading system is being established, it may be more practical and realistic to focus on major, conventional sources. Once the program

has been successfully implemented for major, conventional sources, the banking and trading system can be expanded to include the more difficult problems posed by non-conventional and minor sources.

Minor Sources: Minor sources are those stationary sources which emit less than 100 tons per year of pollution.² This category includes small industrial sources, commercial sources, and household boilers. They are excluded from the new source permitting primarily because of administrative necessity. This is not to suggest, however, that they may not be significant and potentially attractive sources of ERs. As was discussed previously in reference to nonconventional sources, it may also be more cost effective to reduce pollution from these sources than to attempt to obtain additional abatement from large stationary sources.

Inaccuracy of Data: Since reductions must take place in actual emissions, air pollution control agencies may have to establish definite procedures for estimating historical or existing emissions baselines. To do this, air pollution control agencies must develop reasonable, consistent, and reliable procedures for determining baselines which preclude opportunistic behavior on the part of sources. Significant problems exist even for those major sources on the inventory or

under permit for which data on current emissions exist. The accuracy of emissions data derived from both monitoring and engineering analysis, the most commonly used methods of estimating emissions, has been found to be of questionable reliability. (In some situations, however, engineering estimates may be the most effective tool available.) This problem is heightened over time, in part because a source alters its operating characteristics and employs uncertain operation and maintenance practices. A potentially attractive alternative would be to monitor key operating parameters.

How Can Permanent Enforceability of ERs Be Assured?

In addition to the requirements that an ER be confirmed and the level of abatement be accurately assessed, an additional requirement is that the source producing the reduction must permanently maintain that reduced level of emissions. While this requirement will be written into a revised permit, current practices suggest this action by no means ensures the continued compliance of that source with the terms of the permit. One alternative is to limit the certification of ERs to those which are clearly permanent, e.g., the closing of a facility, the shutting down of a boiler unit, a change in process equipment. But this restriction would unnecessarily limit the production of ERs. Instead, the potential benefit from the sale of an ERC could be used as leverage to implement potentially useful

measures to ensure continued compliance. Another alternative would be to require sources seeking to have an ER certified to include monitoring measures such as installing stack monitoring equipment, installing parameter monitoring devices, or periodically sampling ambient air quality at the property line. Alternatively, instead of requiring some form of continuous monitoring, sources which fail to provide such measures could have only a percentage of their ERs confirmed for sale as ERCs.

Assuring the permanency of ERs through continuous compliance is as critical to the integrity of any banking and trading system as it is to attainment. Providing incentives for the adoption of monitoring measures would be a significant boon to state and local APCA efforts to improve the effectiveness of their air quality programs. *A banking and trading system does not present any enforcement problems different from those currently encountered by state and local agencies.* It does, however, provide a mechanism which could be used to create an incentive which would facilitate future enforcement activities.

How Should Administrative Costs Be Financed?

The administration of the certification process will necessarily place an added burden on state and local APCAs. To the extent possible, this burden can be minimized and the possibility of delay reduced by utilizing existing administrative systems. As

²*Alabama Power Company vs Costle* (D.C. Cir. 1979) (No. 78-10006), Initial ruling reported in 13 ERC 1225.

Component 3: Certifying Emission Reduction Credits (ERC)

discussed earlier, the documentation of ERs can readily be incorporated into existing permitting and SIP systems, although exact estimation of actual emission reductions will be difficult.

Possible additional administrative costs associated with the confirmation and permitting of ERs may include:

- Engineering analysis of proposed plans performed by the APCA staff to determine the magnitude of the ER created,
- Site visits by APCA staff to examine the nature of the change, e.g., installation of the control equipment, change in process equipment, shutdown of facility, and
- Monitoring of emissions before and after the proposed change to determine the magnitude of the ER created

The costs of these requirements should probably be born by the source producing the emission reduction and applying for an ERC. The APCA could perform most of the tests and be reimbursed for costs by the source, or the burden could be placed directly on the source to provide specified documentation of the results of required emissions tests which would then be reviewed by the APCA's staff

A possible financing alternative would be to assess a charge on the source in the form of a specified number or percent of ERCs created. In this way, a "public bank" would be created for discretionary allocation, sale, or to offset a future revision in the SIP, in addition to paying for the administrative expenses incurred in the creation of an ER. However, a direct *fee charge* for permit change application, processing, and compliance monitoring of ER's has the important advantage of administrative simplicity—and would not operate to complicate the rules of banking and trading systems.

As emphasized in earlier sections, an ERC is not the same thing as an ER. The ERC is an outgrowth of the ER; this section describes the issues surrounding the ERC's emergence from an ER. This discussion concerns four issues.

- How should producers of ERCs be classified?
- How should sources be classified?
- By what process are ERs and ERCs adjusted?
- How are ERCs to be accounted for?

There is a strong supporting rationale for introducing classification schemes. Although allowing economic growth is one goal of a banking and trading system, growth is only to be allowed if air quality can be simultaneously maintained. Thus, reducing the emissions of current sources is used to create "room" (in terms of air quality) for economic growth. However, as discussed above, the science of measuring and monitoring emission performance is, at best, an inexact one. In this climate of technical uncertainty and administrative constraints, the responsible public authority must move cautiously both in allowing participation in the banking and trading system and in the degree to which emission reductions can be converted into allowances for economic growth. A carelessly

structured and administered banking and trading system will encourage economic growth at the expense of air quality, the Congress has made the policy decision that this is not an acceptable tradeoff.

Thus far, we have discussed the banking and trading system to the point where ERs have been confirmed. It now remains for ERCs to be fashioned from the ERs. The ERC emerges only after the producer of the ER has met the eligibility requirements for converting its ERs into ERCs, the source from which the ER comes is taken into consideration as are the characteristics of the ER, and any "adjustment" measures are taken. Thereafter, the administrative steps of certifying the ERC are taken.

How Should Producers of ERCs Be Classified?

The banking authority should find it useful and necessary to *regulate who can produce and trade ERCs*. However, the eligibility criteria for producing ERs should not create unnecessary disincentives to their production. There are two reasons for this:

- It is in the interest of air quality to encourage the production of as many ERCs as possible—it obviously leads to cleaner air, at least temporarily. The appropriate regulatory body should welcome the decrease in emissions, whether or not it is produced by a source that in the past has been cooperative with clean air goals. (Note that a source cannot produce ERCs until it has reduced emissions

below the relevant baseline. Thus, by the time of ERC production, the emissions requirements at that source will, by definition, be satisfied.)

● **Buyers warrant closer scrutiny** because they seek ERCs for the purpose of increasing pollutant emissions—thus degrading air quality in an absolute sense. In this situation, more so than with producers, there should be concern about past behavior. This is consistent with Clean Air Act provisions which require that all of a source's facilities in a state be in compliance before it can use an offset.

The producer of ERCs and the seller of ERCs, while frequently the same, are not always synonymous. In a system which has some kind of middleman, producer or seller may be different and eligibility criteria will have to be met by both entities. Two eligibility criteria seem most relevant.

● **The current status of the producer** and its past activities in relation to clean air goals—even though the producer's record is not as crucial as that of the buyer, it still is relevant. Past activity is more important if the seller is different (i.e., a middleman) from the producer. Unscrupulous dealings in the past should put a regulatory body on notice that a particular seller may bring more trouble than efficiency to the banking system. In addition, when considering whether a producer source can/will maintain an emission reduction, past performance is

relevant. However, use of past performance as a qualifier can not be left entirely to the discretion of the public body. Rather, explicit criteria must be set and measures taken to assure that producers have prior knowledge of these criteria.

● **The method by which the ER is obtained**—This is a relevant consideration in deciding whether a producer may participate in the banking system. For example, certain reduction activities may be encouraged (e.g., installation of innovative control technology) while others are discouraged (e.g., buying a plant for the purpose of closing it—while this produces the emission reduction, it also costs local jobs and may, therefore, be considered an undesirable method of production). In such a situation, an ER created in an unfavorable manner might not qualify for conversion to an ERC, or might qualify for an unfavorable conversion ratio. It is obvious that in very few instances will an ER be produced if the producer is aware that it cannot be converted into an ERC (except where ERs are created "inadvertently").

How Should Sources Be Classified?

It will be useful to classify sources creating ERs so that the participation of their owners in converting ERs to ERCs can be regulated effectively. Several criteria characteristics could be used to classify sources for differential treatment. Five are mentioned below.

● **The type and characteristic of pollutant.** This basis for classification is probably the most obvious. Different pollutants have different properties; they affect health and welfare differently; they are not equally susceptible to measurement or control; and so on. It seems clear that sources, if classified on the basis of nothing else, must be classified on the basis of the kind (type, size, and source) of pollutant emitted.

● **The size of the source.** It may be helpful to classify sources according to whether or not a source is major or minor. Minor sources should not be excluded from producing emission reductions, since air quality is substantially affected by unregulated minor sources; it is worthwhile to seek minor source participation, especially

since many major sources are already well controlled. However, minor source participation raises difficult questions about permanence and will have to pass rigorous tests to assure permanence. This is particularly true since ERCs used as offsets allow major new sources to permanently increase emissions, while minor sources are not subject to new source review at all. Since major sources provide a single location with greater potential for ERC production, and since these sources are currently the subject of new source regulation, it might be easier to treat them separately from minor sources.

● **Current Compliance Status.** Sources have one of three compliance statuses: (1) in compliance, (2) not in compliance, but on an approved compliance schedule, and (3) not in compliance and not on an approved compliance schedule. This is strictly a factual determination and does not address motive or intent. A

source which is in compliance with the appropriate emission limits should qualify for participation without any restraint based on compliance status. A source not in compliance but on an approved schedule could simultaneously come into compliance and obtain credit for any reductions beyond that required for its compliance, and it might be permitted to purchase credits for expansion purposes. A source in the third category could not produce credits, and serious questions should be raised about its participation in any phase of the banking and trading system.

● *Presence on Inventory* A state or locale's inventory is a touchstone for determining (at least in a first cut) what is a legitimate source. Appearance on the inventory suggests a relatively established source for which emissions may have been catalogued previously, so that a reasonably accurate measure of reductions can be made. The past performance of a source not on the inventory is difficult to track. Sources not on the inventory probably tend to be minor or nonconventional sources. As such, it is not as easy to keep track of or to verify their continued compliance. It is also important to note that emission reduction credits cannot be given for sources not included in the inventory until the SIP is revised to include them.

● *Impending Change in Standards:* There may be various industrial processes that, from time to time, are the subject of new or revised regulations—presumably a further “tightening” of permissible emissions. In such a situation, it may be desirable for the public body to place a temporary prohibition on the granting of ERCs for these process changes so that the new, lower limits cannot be avoided by a last-minute “voluntary” reduction that would soon thereafter be required anyhow. Such a prohibition would necessarily be publicized in advance.

By What Process Are Emission Reductions and Emission Reduction Credits “Adjusted”?

During the trading and banking process, there are three points at which either ERs or ERCs may be adjusted downward for valid policy reasons. The discussion of the adjustment process is in three parts.

● To put the adjustment points in perspective, a brief outline of the banking and trading system is provided and the points at which adjustment may occur are identified;

● The rationales for adjustment are discussed in detail; and

● Three varieties of adjustment are described.

Identification of the Points At Which Adjustment May Occur

Within the five basic components of a banking and trading system, there are five points at which adjustment may occur. This is shown in Exhibit 3, and is discussed below.

Component 1. The ER is created;

Component 2. The ER is confirmed;

● *Adjustment point 1* After the ER is confirmed (i.e., the producing source's permit is changed to reflect a lower level of permissible emissions), the ERs may be adjusted downward for two reasons: (1) uncertainty concerning the creation, magnitude, and permanency of an ER, and (2) producer or source classification. Thus, the producer may be required to maintain emission levels that are lower than the reduction level on which its ERCs are based.

Component 3. The remaining ERs become ERCs and are entered and stored in a central registry;

● *Adjustment point 2.* The ERCs just created from adjusted ERs may themselves be adjusted for two possible reasons: (1) to help finance the administration of the banking and trading system, (2) to create a public reserve or help drive attainment.

Component 4. The ERC is banked and/or traded, and

● *Adjustment Point 3* While the ERC is banked, and prior to its use, ERCs may be adjusted to reflect a change in the SIP or national ambient air quality standards.

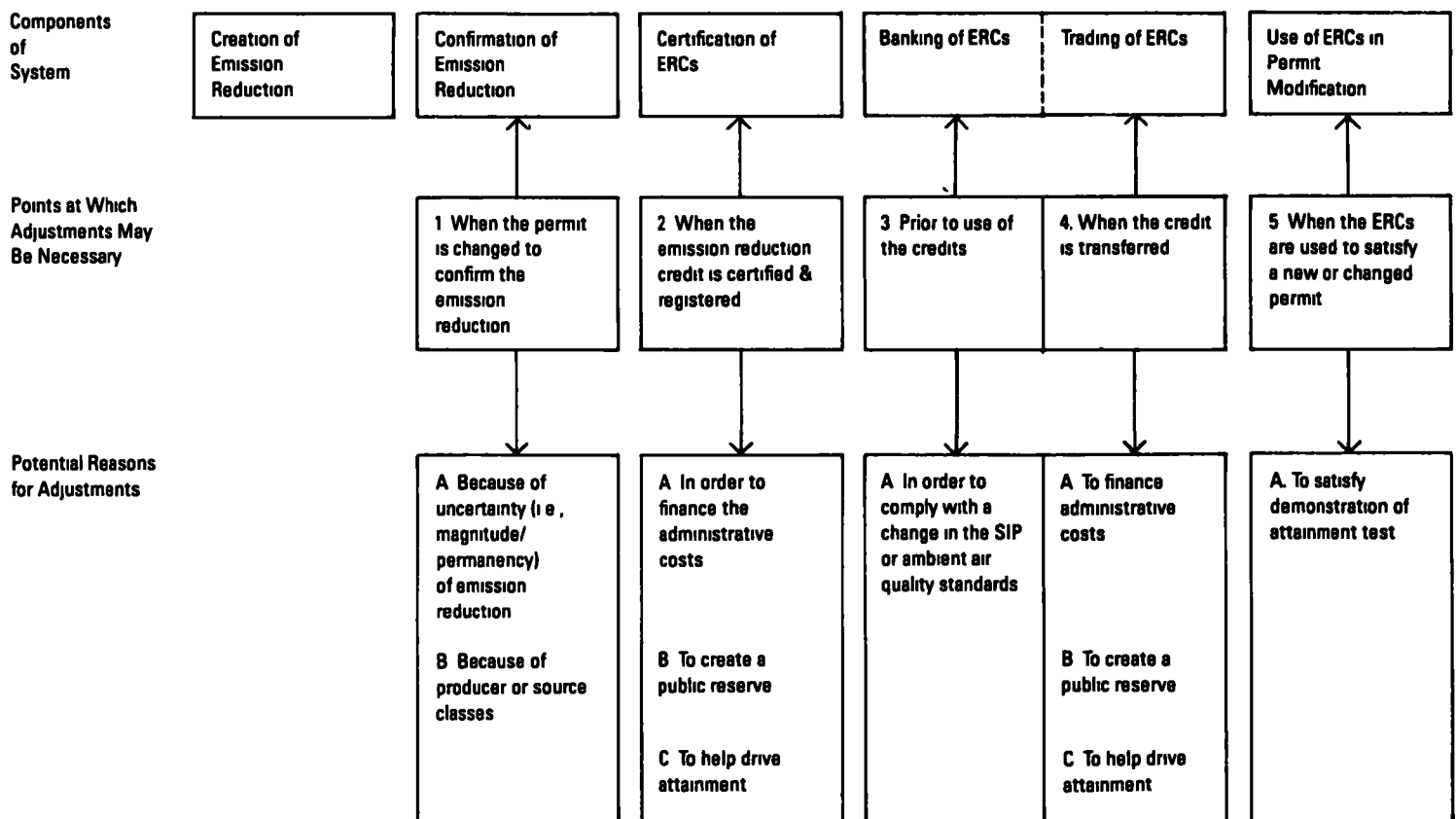
● *Adjustment point 4* At the time of sale, the buyer should be aware of what the precise “loss” is that it will suffer from this adjustment. The adjustment may be made for two possible reasons: (1) to help finance the banking and trading system, and (2) to create a public reserve or to help drive attainment.

Component 5. The ERCs are used up in permits. The buyer's permit is issued or revised to reflect compliance through the use of the ERCs.

● *Adjustment point 5* When the ERCs are used to satisfy a new or changed permit, it may be necessary to adjust the ERCs to satisfy the “demonstration of attainment” test. An ERC is a type of contingent “procedural” property right which entitles users to have permits adjusted or issued according to the requirements of the Clean Air Act and incorporating an emissions allowance based on a confirmed and permanently enforceable preceding emissions reduction. Thus, the ERC is clearly not an absolute license to pollute.

Exhibit 3

Potential Adjustments to Emission Reductions and Emission Reduction Credits



The Reasons for Adjustment

Six reasons for adjusting ERs and ERCs were noted above. They are discussed below in terms of legal, political, administrative, and incentive issues.

Reason 1. ERs may be adjusted to compensate for uncertainty in the technology used to create and measure the ER. The underlying purpose is to assure that credit granted corresponds to emission reductions which were actually created.

● **Legal Issues.** There should be no legal problems related to this reason. Uncertainty should be relatively constant for types of industries and pollutants, and the adjustment should be relatively uniform (thereby avoiding any equal protection problems).

● **Political Issues.** This reason for adjustment should not cause significant political difficulties. Given the state-of-the-art in emission control and measurement technology, the need for a downward revision to compensate for uncertainty is readily apparent. Uniform handling of this downward revision (e.g., a flat percentage adjustment for a particular pollutant emission) enhances its acceptability.

● **Administrative Issues.** There are significant administrative problems raised by this reason. Initially, there will be technical debate to determine what levels of imprecision exist and what the proper response to such imprecision should be. Subsequently, as the state of

the art improves, the means of compensating for uncertainty will have to be altered. The administrative burden of resolving technical debate and keeping abreast of technical developments could be substantial.

● **Incentive Issues.** This reason for adjustment should not create any perverse incentives if the reduction in ER is reasonable in light of the level of uncertainty. It may, however, have the negative impact of encouraging the use of existing technology.

Reason 2. ERs may be adjusted because the producer or the source falls within a particular classification. This is an attempt to assure that, if the source or producer fall within a defined class, the ERs are revised downward for valid policy reasons. (see the preceding discussion on producer and source classification).

● **Legal Issues.** Equal protection issues probably would arise due to the differential credit allowed based on source classification. However, as long as the classification is reasonable and shown to be related to the regulatory purpose, the equal protection claim would not stand.

● **Political Issues.** The political repercussions from this method are sure to be strong. Source classification will cause significant discrimination in credit allowed. Although no source should be classified without substantiating evidence, documentation, and explanation, it still

may be difficult for a source owner in a valley to understand why the reduction credit allowed is only 60%, whereas the same kind of source on a plain is allowed 80% credit. Some effort will be required to make difficult technical issues comprehensible to the public.

● **Administrative Issues.** The adjustment imposes great difficulties on an administrative system. For example, different sources could be subject to different downward adjustments depending on age, past performance, and a host of other variables. To keep track of these variables would be a difficult and time-consuming task (assuming that a banking region has enough sources to constitute a viable market).

● **Incentive Issues.** Treating producers and sources differently may have the effect of encouraging more ER production and more economic growth in those industries for which the adjustment is less severe. A significant incentive problem would also be posed by the consideration of past performance. This is sure to provide a disincentive to the "bad actor" unless it is carefully fashioned. While past behavior seems relevant, it should not obscure the purpose of a banking and trading system—to produce as much ERs (and ERCs) as possible.

Reason 3. ERCs may be adjusted to help finance the banking and trading system. The public authority could take some of the ERCs from both the producer and the buyer for

it to sell on its own account. Proceeds from the sale of these ERCs would help the public authority to finance the banking and trading system's costs. An alternative, of course, is to charge the producer or buyer a flat fee in the nature of a brokerage fee or user charge (i.e., for using the banking and trading system). This latter alternative is preferable because it avoids undue complication of the system.

● **Legal Issues.** Adjusting to finance the banking and trading system should qualify as a valid exercise of the police power. To be a valid exercise of the police power, courts generally require that the amount of the fee (here, it would be some amount of ERCs) bear some relationship to the costs of regulation, inspection, or monitoring necessitated. If the fee greatly exceeds these costs, it is generally held to be either a tax or an illegal exercise of the police power. Many states recognize an exception to this rule where the fees are also based on the indirect (e.g., social) costs to the public suffered as a consequence of the activities listed. In addition, another exception appears to be recognized by most courts and allows police power fees to be set high enough to effect a reasonable restriction or restraint of business activities deemed harmful to public morals, productive of disorder, or injurious to the public.

● **Political Issues.** Initial opposition would come from the producers and buyers of the credits. They probably would argue that the costs of

running the banking and trading system were too high. If economic gains are sacrificed because of this adjustment, subsequent opposition might arise from community leaders and from the workforce. When the economic tradeoffs become apparent, many individuals and politicians may be willing to compromise environmental values.

● **Administrative Issues:** Adjusting to finance, at least in part, the operating expenses of the banking and trading system does add a significant administrative burden. More is required than just a few additional lines in a ledger. The ERCs used for financing purposes must be managed or disposed of—this is not a self-executing task.

● **Incentive Issues:** This adjustment will affect the incentive to produce ERCs. If the “payment” to the public authority is too high, it will cost the producer more to produce its “net” ERCs than some buyers may decide to pay. The practical result will be that ERC production will cease, defeating both purposes of the banking and trading system (enhancing economic growth and improving air quality).

Reason 4. ERCs may be adjusted to help create a public reserve. The ERCs taken from producers and/or buyers could be set aside for public use—whether to maintain clean air or to promote certain types of economic growth.

● **Legal Issues:** The public reserve purpose for adjusting seems, like the financing

purpose, to fall within the valid exercise of the police power.

● **Political Issues:** Opponents to this aspect of adjusting (initially producers and buyers would object, but others would join if the economic consequences become more widespread) probably will argue that the public reserve is too large. The adjustment level must be set prudently, so that its use is not unreasonably burdensome.

● **Administrative Issues:** The public reserve will create management requirements and undoubtedly will induce controversy over its use—should it be set aside (like a national park) to be used only for clean air purposes, or can the public authority use it to encourage or direct economic growth in the locale or state. Other possible uses will be suggested, and strong opinions are sure to arise in favor of the several possible uses.

● **Incentive Issues:** This adjustment can either reduce the supply of ERCs (if the public reserve is used solely for clean air maintenance) or increase the public authority’s stance as a competitor with producers of ERCs (if the public reserve is used to encourage economic growth). In the former instance, the price for ERCs should respond to the supply (i.e., if ERCs are “retired” in the public reserve, ERCs will be more scarce and consequently should bring a higher price per unit), but it is not clear how elastic the demand is. Response to the expected higher price might offset the producer’s reduced supply. In the latter instance,

however, the public reserve competes with the private supply, and care must be taken that such competition does not result in a significant lowering of ERC production or price.

Reason 5. ERCs may be adjusted when an SIP is altered to further restrict allowable emissions. In such a situation, the ERCs might be subjected to a pro rata reduction or to some other form of downward adjustment. This adjustment is removed in time from the other adjustments. It affects all ERCs that have been certified, but not used. This adjustment would diminish outstanding ERCs to the point that if they were used immediately, the new SIP standard would not be violated. This can occur only after the ERC has been certified and before it is used by either the producer or a later purchaser. Thus, if a buyer purchases the ERC and holds it without using it (i.e., without having its permit altered), the ERCs so held would be subject to downward revision to accommodate a SIP change

● **Legal Issues:** There should be no legal difficulty with this use of adjustment. However, it would be prudent to advise the holder of the ERC at the time the ERC is obtained (either through creation or purchase) that until it is used, the value of the ERC is subject to certain contingencies, including a reduction in its quantitative worth.

● **Political Issues:** If adjustment is done on a pro rata basis, there seems to be little difficulty from the political

standpoint. However, if some differential reduction is applied, substantial political problems may appear.

● **Administrative Issues:** Applying this adjustment should be relatively easy from an administrative standpoint. In terms of an SIP change, the discount can be made on the credit ledger and the holder can be notified (this assumes that there is some central registry).

● **Incentive Issues:** If uncertainty exists about the actual ERC quantity a source has (after having either created or purchased it), there may be some reluctance to participate in the process. What actually may occur is that the ERCs will be purchased only as the need arises, instead of for future expansion plans. This should not have too adverse an effect on the production of ERCs (assuming the price adjusts with any changes in supply). Speculation, if permitted, may occur. In fact, the prospect of diminishing supply at a higher price may be incentive to purchase early against future shortages, thus assuring that some ERCs will be available if needed. In the final analysis, ER production will continue as long as it pays the producer to do so—i.e., as long as the marginal cost of production is less than the marginal price the producer can obtain, the production will continue. This assumes, of course, that the particular market is operating efficiently, especially in terms of information flow.

Note that Reason 5 risks both in delaying ER production and in proceeding with ER production. Delay may result in a lost opportunity to create ERs (i.e., if the SIP is altered to further restrict allowable emissions, a producer probably will have less room for improvement after meeting the amended SIP). Alternatively, proceeding with ER production at an early date does expose the ERC to possible discounting. However, something is better than nothing, especially since those somethings—bankable emission reduction credits—will be significantly more valuable after a major SIP revision.

Reason 6. ERCs may be implicitly adjusted during a permit application to satisfy the requirement in non-attainment areas that any use of an ERC as an emission offset must satisfy the "demonstration of attainment" test. The relative location and pollutant characteristics of the buyer and producer of the ERC will determine the ERCs required for a transaction between two particular parties.

● **Legal Issues:** There seems to be no legal difficulty with this use of adjustment. It is merely an application of existing policy interpreting the Clean Air Act's requirement that in non-attainment areas "reasonable further progress" be made in achieving ambient air quality standards.

● **Political Issues:** There may be some political difficulty in adjusting for this reason—offsets should not necessarily be used to "drive" attainment if the adjustment is more than

necessary to sustain reasonable further progress (RFP), it could run into significant resistance. Explicit criteria should exist for determining the offsets required to satisfy the demonstration of attainment test.

● **Administrative Issues:** The major difficulty will be determining the ratio of ERCs to new emissions required for an offset. If general guidelines showing the affect of location, plume rise, etc., cannot be devised, some degree of emission dispersion modeling may be necessary to determine that the reasonable further progress requirement is being satisfied.

● **Incentive Issues:** Incentives should not be adversely affected if requirements are not excessive. It is a policy currently in effect and requires only a small "discount" as currently interpreted.

Three Concepts of Adjustment

There are three concepts around which downward revision of ERs and ERCs may be organized.

● **Tax:** The means of adjusting ERs and ERCs could be called a tax. If "tax" is used, however, special legal and political problems are created that otherwise could be avoided. "Tax" is a term which flags everyone's attention and evokes strong reactions. It may be prudent to apply some other term to the adjusting process, especially for those kinds of adjustment which in no way are taxes.

● **Adjustment:** The term "adjustment", used above as a generic term, is accurate for reductions *not* intended to raise "emission reduction revenue" for use by the state. "Adjustment" aptly describes the fine-tuning necessary to bring the idea of ERCs into harmony with reality.

● **Discount:** Discounting accurately describes the process of reducing the quantitative value of ERs and ERCs when the total set of emissions allowed must be reduced to bring an area into attainment. Again, this term is not as evocative a term as "tax".

Any of these three (or other) terms could be used to describe the downward revision of ERs and ERCs. However, though substantively they accomplish the same result, careful consideration should be given before a short-hand term is selected for the different contexts in which adjustment may occur.

How Are ERCs To Be Accounted For?

To maintain order in the creation and transfer of ERCs, some accounting process must be used. This will impede fraudulent use of ERCs, carelessness in transferring ERCs, and generally will enable the public authority operating/overseeing the banking and trading system to keep a tighter rein on banking and trading activities. The ERC accounting system should coincide with the permitting and SIP systems in order to achieve maximum efficiency and accuracy. Administratively, it should be relatively easy to establish one set of books which would include information on permit limitations, including their quantity, their characteristics, and any downward revisions which have been assessed against ERs. These records should also include the conversion ratio applied to create ERCs, the number of ERCs (their characteristics should be the same as those of the ERs from which they are derived), and any assessments against ERCs. The registry would denote creator, chain of ownership, etc.—in sum, a running tally of the ERC's history until it is extinguished by use (i.e., the buyer has its permit changed). The registry should contain all information necessary for a potential buyer to make an initial

Component 4: The Banking and Trading of ERCs

determination of the potential utility of the ER for the buyer's particular use. Available ERs should be indexed by pollutant type and location and, if feasible, be recorded on a computerized system. General guidelines concerning geographical limitations on the use of ERCs should also be readily accessible. Because the banking and trading system is very sensitive to misuse, this careful "tracking" is necessary. The final registry might be analogous to the system of recording requirements for real estate and its transfer. A registration system for ERCs should be centrally compiled so errors can be minimized and more easily located and resolved. For information purposes, duplicate sets could be placed in key locations throughout the banking region. Presence on the registry should be an invariable requirement for the transfer and use of an ERC.

Once the ERC is created, it is transferable according to the rules of the particular banking and trading system. These rules will deal with two primary issues:

- What buyer eligibility criteria should be established for participation in the banking and trading system?

- What requirements does the banking and trading system place on the actual mechanics of the transfer process?

The first issue is discussed here in some detail, and the second issue is overviewed. A full treatment of the second issue is presented in Part III which discusses in detail three alternative banking and trading systems.

How Should Buyers Be Classified?

This is a crucial issue because buyers are a key point of control and enforcement. The banking and trading system cannot succeed if ERCs are misused. It is reasonable, therefore, to impose some restrictions or requirements on those who wish to purchase ERCs. Several criteria seem especially relevant.

- *Current Status*—The question posed is whether the buyer owns or controls other sources which are not in compliance with relevant ambient air quality standards? The public authority could require a buyer to be in compliance with emissions limitations at all sources it owns or controls.

- *Benefits of Trade*—The public body may want to limit participation of buyers who will obtain the most economic "mileage" from the ERCs. This could be in terms of jobs, gross products, etc.

- *Reason for Purchase*—This issue goes to the nature of the buyer: Is speculation permitted? Can environmentalists participate and buy credits that will be withdrawn and not used for economic growth? And so on. The underlying question is whether the buyer will use the credit to fuel additional economic growth. This can be a difficult question to answer since there is no objective test to determine whether a purchase is to be made for purposes of economic growth. In addition, there would be strong sentiment both to permit purchase for non-economic reasons and to forbid such purchases. Whether or not other users (i.e., environmentalists, speculators, etc.) are permitted is a policy decision to be made by the appropriate public authority. However, the legal and administrative realities may limit actual policy choices.

- *Government Subdivision as Purchaser*—It is possible to permit intervention by the public body in the purchase of ERCs (e.g., by tightening standards on existing sources to obtain ERCs). This intervention could supplement an economic development role, and also could be used to effect other desirable goals (e.g., countering market dominance).

- *Past Performance*—While not central to producer eligibility, past performance is crucial to buyer eligibility. The question is whether the buyer, if not cooperative in the past, should be permitted to benefit under this system which facilitates economic growth. It is reasonable to suggest that such buyers be required, as a gesture of good will, to meet some higher standard for participation (e.g., they may be required to contribute more to a public reserve of ERCs). However, it should be remembered that the central purpose of the banking system is to permit economic growth and not to punish past misdeeds.

- *Market Dominance*—This issue has two facets. The first regards a potential buyer that has a market dominant position in the banking region. The public body may want to limit such a buyer's opportunity to solidify its dominant position by obtaining ERCs necessary to economic growth. The other facet goes to intent and is very difficult to determine—is the buyer trying to attain or maintain a market dominant position by purchasing ERCs so that competitors will be excluded from expanding or locating in the banking and trading region. The public authority will have to determine, first, is it possible to deal with this issue and, second, if it wants to deal with this issue. (Note that anti-trust law could inhibit the market dominance strategy described above. However, there would be a lag time before anti-trust enforcement action "caught up" with such a ploy.) There are means of

Component 5: Permit Modification to Use the ERC

dealing with the market dominance issue. For example, there could be limits on how much of the bank any person or firm could control. Another possibility is to limit participation to persons or firms who have less than a specified percentage of the market.

What Requirements Guide the Actual Transfer Process?

The final part of this paper discusses at length three alternative banking and trading systems. The three are summarized below with special emphasis on the sales process.

- *The public auction system:* The public authority collects, either by purchasing outright or by taking consignments, ERCs for sale at a public auction. The form of the auction may vary (see the discussion below on the differences of the "Dutch", "English", and "Traditional" options), but the public authority controls who may bid, whether or not minimum bids are required, frequency of auctions, and the block size of ERCs offered.

- *The public monopoly/monopsony system:* The public body could act as the sole purchaser from producers/sellers and the sole supplier to buyers. ERCs are collected only through purchases from the producers of ERCs. The public body determines to whom it will sell, what the conditions of the sale are, and what price will be charged. However, there probably will be some room for limited

negotiation between the public body (monopolist) and the buyers. It is not necessary that the monopoly or monopsony organization be publicly owned. For example, the public body could grant the monopoly to some private organization—perhaps along the lines of a turnpike concessionaire who bids for the right to operate the monopoly. In addition, the public body could retain control of this system, but rather than sell the ERCs, it would give them away to new sources as a means of promoting economic growth. Where the market does not generate enough capital to support one of the other banking and trading options, the monopoly/monopsony option can generate the desired level of activity. Instead of funding the purchase of ERCs through the proceeds of sales, the public body could assess a tax against all existing sources and provide ERCs to new sources free of charge.

- *The private trading system:* There are many variations of this system, but all must involve some degree of public intervention. At a minimum, the public authority will have to direct the process of certifying/registering ERs and ERCs, and monitoring/enforcing their proper use. Additional public involvement ranges from no control over ERC price and market participation to stringent guidelines regarding prices and market entry. However, negotiation and sale consummation will be accomplished through the private parties involved in each transaction.

Once a transaction has occurred, the emission reduction credit can be applied toward compliance with the emission standard faced by its new owner. This last step in the trading and banking system incorporates the transfer of an ERC into the permitting system at which time the ERC is extinguished. It attempts to ensure that ERCs are properly used and recorded. Issues arising in the design of this component include:

- How should ownership of ERCs be confirmed?
- In what regulatory contexts may ERCs be applied?
- Are the ERCs of the appropriate characteristics for the source seeking to use them?
- What permit changes are necessary?

How Should Ownership of ERCs Be Confirmed?

Before approving a new source permit or altering an existing permit which includes the application of an ERC, the state or local APCA would first want to confirm that the prescribed ERC is genuine, and that the source is the legitimate owner. Because notification of the registry would be a requirement of any transaction, this information should be readily available from a central registry (discussed earlier). Thus, the registry serves the dual function of providing information concerning the availability of ERCs and

documentation relating to ownership. In the context of the latter function, the registry should reduce the likelihood of an ERC being sold twice or being fraudulently created, and therefore should provide the level of certainty critical to creating an effective market for this commodity.

In What Regulatory Contexts May ERCs Be Applied?

There are several possible regulatory requirements to which ERCs may be applicable. The use of internal and external offset arrangements has been proposed and adopted in a number of contexts and has resulted in considerable litigation.

At this time, ERCs could be applied to:

- a new source wanting to locate in a non attainment area;
- an existing source wanting to expand in a non attainment area;
- a new source wanting to locate in a PSD area but with emissions which would bump the allowable increment; and
- internally within an existing source seeking a less costly means of satisfying an SIP requirement (i.e., the bubble).

Alternative Banking and Trading Systems

The APCA creating the banking system may decide to limit the use of ERCs to one or more of these contexts. Alternatively, it could decide to provide different requirements for each. This decision would be determined by air quality characteristics (What class: PSD? Non attainment?) and by the exact nature of the incentive sought by the APCA. It should be noted, however, that broader application of the banking and trading system would increase the number of potential buyers and sellers and therefore would be somewhat more advantageous.

Are the Emission Reduction Credits "Appropriate" for the Proposed Use?

Before a permit can be changed to reflect the application of an ERC, the APCA will first have to make a final determination that the magnitude of the ERC offered and its pollutant characteristics (e.g., pollutant type, size of particles, source) are appropriate for the proposed use.

Presumably, the source seeking to apply the ERC to its permit had performed the required analysis and had discussed the matter with the APCA authority at a pre-application conference. At the time the owner came into possession of the ERC (either having created the ER itself or purchased the credit), it should be clear what is permissible and what requirements will be imposed on the use of the ERC. Unless a potential owner of an ERC can be reasonably certain of these factors before actually taking ownership of the ERC, the uncertainty surrounding future use would severely impede the efficient functioning of a market. If these precautions are taken, final approval of the particular use of an ERC and documentation of this use through its recordation in a permit should be little more than a perfunctory administrative step.

What Permit Changes Are Necessary?

If deemed suitable to be used to satisfy the required emission standard, the ERC would be "extinguished" as a credit in the registry. At the same time, use of the credit would be entered as part of the permit for the source to be applied against the source's actual emissions. The registry would document the creation and eventual use of the ERCs.

It should be noted that the magnitude of the emissions offset by the ERC will not necessarily be equivalent to the certified amount of the credit. The APCA may require a more than one-for-one offset to ensure the achievement of reasonable further progress, or it may assess a charge in order to pay administrative costs, or to establish a public bank. This is discussed at length in a previous section on adjustments.

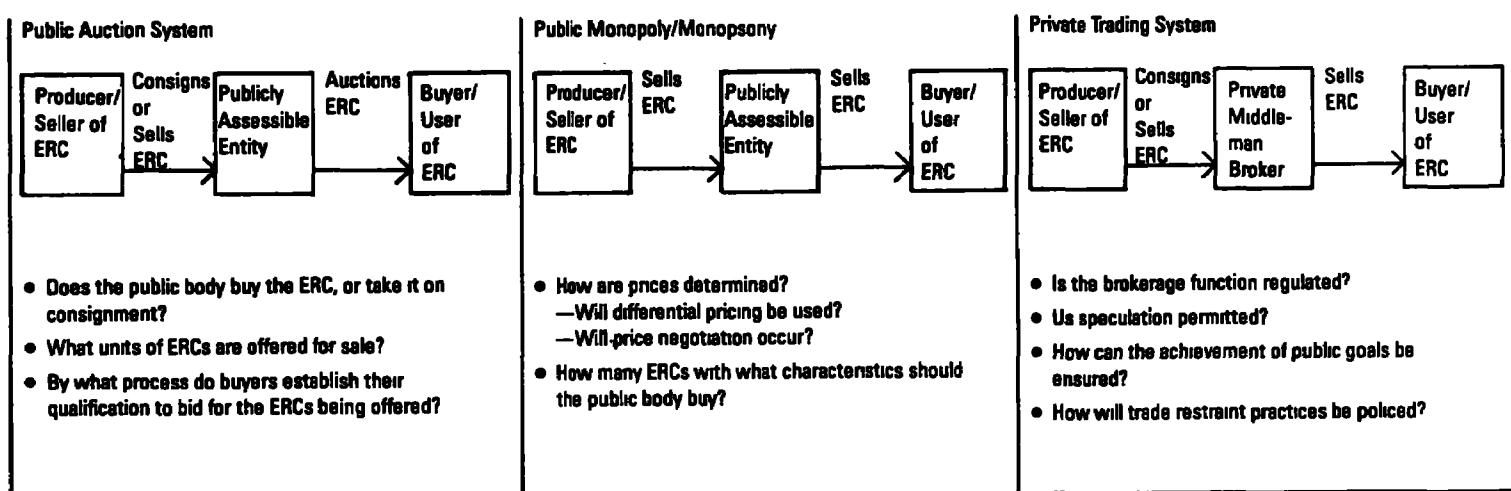
At the time the source's permit is changed or issued (for a new source), it is also necessary to change the SIP to reflect the rearrangement of emissions. In addition, in those situations where a greater than one-for-one offset was required, the total amount of emissions would be reduced and should be reflected in the SIP. Because of trading and banking, changes in the SIP may become more frequent and it may be desirable to reduce some of the administrative steps currently required. It may be possible to exempt SIP changes related to banking from some of these requirements or to develop a more effective means of satisfying the goals of these procedures. One possibility might be to include ERCs in a state protected "growth" margin.

Three alternative banking and trading systems (two "public" systems and one "private" system—see Exhibit 2) will be the subject of three "manuals" to be prepared by the ICF project team. In this section of the initial concept paper, the following issues are discussed:

- What are the relative merits of public and private systems?
- What are the characteristics of a public auction system?
- What are the characteristics of a public monopoly/monopsony system? and
- What are the characteristics of a private trading system?

Each system will be described, including its advantages and disadvantages. In addition to these three systems, hybrid alternatives are possible and are briefly discussed to show the flexibility available to states and locales in developing a system suited to their unique requirements.

Exhibit 4
Three Alternative Banking and Trading Systems and Representative Issues



- In general, what are the relative merits of a public and a private system?
- Who qualifies to produce/sell/buy ERCs (i.e., how is market entry regulated)?
- How will the system be financed?
- What incentives are created for each participant?

What are the Relative Merits of Public and Private Systems?

Selecting between some kind of public or private system requires consideration of the relative advantages and disadvantages of each. Although there is not always a one-for-one comparison between an advantage in the public system and a disadvantage in the private system (and vice versa), this frequently is the case. Some of the most important advantages and disadvantages are discussed topically, below.

● **Market Certainty**—Initial success of a banking system may hinge to a large degree on how certain the emission reduction credit (ERC) market is. The public alternatives provide more assurance for potential buyers and sellers (because of government control of prices, supply, market entry, etc.) than do private alternatives.

● **Socially Desirable Goals**—A banking system can take account of a broad range of goals in addition to economic efficiency. For example, considerations of equity may lead to exclusion from or limiting of participation in the banking system by a particular source owner. A private system, concerned primarily with economic efficiency, might not respond to this kind of concern. It is possible, however, to design a private system so that social goals are adequately considered. Yet in the prototypical private model (i.e., one with very limited government intervention), these goals may not be

achieved. The public alternative would be able to control this situation. It would also be more effective in preventing the creation of private monopolies achieved through purchase of available ERCs. In addition, it could encourage entry of new sources by adjusting the price of ERCs.

● **Transaction Costs**—Both public and private systems create transaction costs that are avoided by the other system. The public systems introduce more “red tape” than the private system simply because a public body is involved as the middleman. Although there may be less red tape in a private system, more time will be required to locate buyers and sellers, to negotiate sale prices, and other elements of the ERC transfer transaction. It also will be necessary to closely coordinate the activities of the private system with the local APCA.

● **Market Stability**—This refers not to the initial certainty discussed above, but to the market’s long-term stability. The public system should be able to avoid much of the fluctuation which a private system may exhibit—especially in terms of ERC price. This greater stability of price may reduce the potential for opportunistic prices which could result where buyers are not fully aware of prices. However, certainty may be achieved at the expense of economic efficiency.

● **Incentives to Produce ERCs**—The private system may provide greater opportunity for the profit incentive to operate in encouraging the production of ERCs. When prices are manipulated/set by the public body, they may be lower than a market-determined price. In such a situation, fewer ERCs will be produced than if there were no publicly-set price. (Note that “publicly-set” prices can also refer to prices determined publicly, not just prices set by a public body. Thus, an open auction could result in “publicly-set prices”) Such “public” prices would provide a tremendous incentive for the production of ERCs, acting as market signals to potential producers. “Private” negotiations would often deprive the market of this important information. Alternatively, it may be possible for an artificially high price to be set by a public body purchasing the ERCs from the producer. There is precedent for this kind of government-induced production incentive.

● **Duplication of Effort**—To keep the prices for ERCs at a level which will encourage activity, the public body would have to keep abreast of developments in the business and technological community. This attempt to keep current in the demand and supply levels for credits is extremely difficult to do and may duplicate existing private efforts to maintain awareness of these same developments.

The “public” advantages are that the regulatory body is able to control the system enough to ensure that all public policy goals are taken into consideration and to avoid the ill effects perceived to occur when only economic efficiency and market allocation goals “drive” the system. Thus, in a “public” system, economic growth can be encouraged in situations or locales where it would be discouraged by a “private” system; private monopoly situations can be avoided; recalcitrant sources can be prevented from profiting through their past uncooperative behavior; and so on. While a purely private market system does not provide these advantages, it does provide a simple and efficient mechanism for achieving the primary goal of a banking system—permitting economic growth while safeguarding air quality. What is required in this situation is a policy decision about what is expected from a banking system—is it to be a system which promotes economic growth and safeguards air quality without regard to collateral issues and concerns, or is it to be a system which sacrifices some efficiency in promoting environmentally safe economic growth in order to protect other societal values.

What are the Characteristics in General of the Public Auction System?

This system is operated entirely by some banking and trading authority—already existing or created specifically—to administer the banking and trading system. The banking and trading authority does not have to be a public (i.e., government) body, but the auction must be publicly conducted. (Note that “public” in this sense differs from “public” in the monopoly and monopsony option.) The gist of an auction system is that a responsible banking and trading authority governs the transfer of ERCs by conducting auction sales of credits to qualified bidders. The banking and trading authority acts as a middleman or sales agent in bringing the buyer and seller together. However, it should be emphasized that a public body (e.g., the Air Pollution Control Agency) may be involved to the extent that it regulates who may create, sell, and purchase reduction credits as well as other related issues.

Description. The auction alternative encompasses a number of options, including three discussed below:

- The “Dutch” auction;
- The “English” auction; and
- The “Traditional” auction.

In each of these three, the actual auction is conducted differently, but some common issues exist. These issues relate primarily to administration of the auction system and to other support activities. These issues are discussed briefly, and then the three auctions are described in detail.

Issues. The administrative and other support functions are framed in terms of options—i.e., there are several means to achieve a particular end, and a decision must be made about which of those means to use.

● **Publicity:** The auction must be publicized, and there are several means of doing this—advertisement in local newspapers, mailouts to sources on the inventory, personal contacts, and publication in trade/industry journals are possible ways to accomplish this. In addition to the medium of publicity, a decision must be made about the content of publicity—it can be very brief with a contact-person listed for further information, or it can be quite comprehensive in listing number and characteristics of the ERCs that will be offered for sale.

● **Transfer to the Trading and Banking Authority.** The trading and banking authority can obtain the ERCs for the auction in two basic fashions: it can purchase them outright or it can accept the ERCs on consignment. The purchase option contains inherent risks and benefits—the trading and banking authority may not be able to sell ERCs at the price it paid (to avoid this it might set minimum bids) or it may be able to turn a “profit” (thereby financing at least a portion of the system). On the other hand, the consignment option is safer, and the banking and trading authority does not run the risk of losing money in the transaction (or being left with a supply of unsold ERCs) nor would it have the opportunity

of turning a “profit”. (However, the consignment option may provide less incentive to the public body to “move” the ERCs.) In subsequent discussion, the banking and trading authority will be described as “collecting” the ERCs for sale—this term includes both the purchase and consignment options.

● **Reserves:** When an auctioneer has items on consignment, the consignor may establish a price below which it does not want to sell. This is referred to as a “reserve”. In the ERC auction, the banking and trading authority may or may not want to permit this practice. However, the use of it does give the producer/seller some certainty, and this certainty will strengthen the incentive to produce ERCs. The banking and trading authority also may use a version of the reserve by setting minimum bids.

● **Pre-auction Conference.** It may be advisable to hold a pre-auction conference to explain to bidders the rules to be used in the conduct of the auction (The same conference might include producers/sellers, but logistically it seems that they will have to have been familiarized with the system before they sell/consign ERCs to the banking and trading authority.) Instead of a conference, it may be possible to prepare an information packet which will detail the information for bidders.

● **Credentials for Use of ERCs:** There may have to be some process whereby bidders establish their qualification to

use the ERCs being offered (especially if participation in the banking and trading system is limited to those who are using ERCs for economic growth). This can be done on a personal one-on-one basis—representatives of the banking and trading authority and the public body will meet with a representative of the potential bidder to evaluate the potential bidder’s qualifications. Alternatively, the potential bidder can submit documentation for review and verification. There also could be a combination of these two alternatives. For example, private firms could be licensed to perform this analysis and certify appropriate trades

● **“No Sells”:** It is possible, in some of the auction options, to have items offered for sale which are not purchased. (In the “Dutch” system, this is not a problem as will become evident in the description of that system.) A decision must be made whether to hold on to the no sells (until the next auction) or whether to try to dispose of them by a direct sale. Of course, if the public body takes the ERCs on consignment, this is not a problem—the “no sells” are merely returned to the producer (or retained for the next sale). However, if this occurs too often, it will be a disincentive for the creation of ERCs; in such a situation, the public authority may want to consider “buying in” the unsold lots, with the price established by some formula based on the successful bids on the ERCs which were sold at the auction.

● **Unit of Sale:** There are a number of options for the unit of sale. Once the method of quantifying the ERCs (an issue discussed elsewhere in this concept paper) is determined, there will presumably be a single unit which can be identified (for example, one ton/year). Three options are possible for the number to be offered for sale:

● they can be sold singly (i.e., one unit);

● they can be sold in uniform blocks (e.g., 10 ERCs/block); and

● they can be sold as they are created by the producer/seller (i.e., if a producer/seller created 9 ERCs, they would be sold as a block—there would not be uniformity amongst the blocks offered for sale).

There are advantages and disadvantages to each of these options. The single unit sale enables each source to buy only the amount it needs—thereby facilitating maximum economic growth. However, units would not be created on a single unit basis, and permitting single unit purchase would involve additional administrative effort to keep track of how much of a particular "lot" had been sold and for how much. The uniform block approach imposes a rigid framework which may require buyers to over-buy in substantial amounts. Not only does this reduce economic growth potential, but it drives up the effective price for a buyer to expand to the degree planned.

For example, if a buyer needs only 10 ERCs, but only 15 unit-blocks are available, the cost of expansion will be 15 ERC units and not 10 ERC units. The adverse effect created by this situation may be modified if the excess 5 ERCs are viewed as an investment; but in terms of immediate cash outlay, the cost remains at 15 ERC units. This may not be a significant deterrent to large firms, but it may prevent smaller firms from entering the ERC market—thus contributing to market dominance. The sell-as-created option imposes little administrative burden and facilitates accounting requirements. However, it also suffers the drawbacks of non-flexibility exhibited by uniform blocks.

● **Classification of Bidders:** This is a difficult issue. For example, a particular ERC in particulate emissions may be worth more to a facility near the producer of the ERC than to a similar plant further away. The reason related to the diffusion of emissions and their effect on ambient air quality. An ERC represents an improvement in air quality that is being used to offset a degradation in air quality.¹ An ERC will represent a greater improvement in nearby air quality than in the air quality

¹EPA's Emission Offset Interpretative Order states that to achieve reasonable further progress (a requirement for each offset trade), a higher ratio of offsets (ERCs) will be required the further away a facility is from where the offset was created. Each trade must satisfy the "demonstration of attainment" rule

at a distant site. Consequently, the ERC may be worth more (i.e., will permit more pollution to be offset) to a source near the producer than to a source further removed. An example illustrates the point. Source A installs technology which leads to the creation of 10 ERCs. Source B is one mile from A, and Source C is 100 miles from A. The reduced emissions have a greater impact on ambient air quality closer to A than further from A (at least in the simplistic world of this example). Because B and C are differently situated, their respective uses of A's ERCs would probably differ. It may be useful, in dealing with such situations, to develop a matrix indicating what differently situated sources can do with the same ERC. The matrix should be geared to a demonstration of attainment by the purchasing source. In this example, such a matrix probably would require that C buy more of A's ERCs than B in order for C to increase its emissions by an amount equal to B's increase. It will be necessary to clearly inform buyers of how many ERCs are needed to satisfy the "demonstration of attainment" rule.

The discussion of these issues indicates that many options exist concerning the structure of the administration and support of a particular auction system. The three alternative auction systems² are next described and

²The discussion of the "Dutch" and "English" systems is based on de Lucia, *An Evaluation of Marketable Effluent Permit Systems*, pp 17-20 (1974)

critiqued in terms of their advantages and disadvantages.

The "Dutch" Auction System

The "Dutch" auction system is a method for determining the market clearing price of the ERCs. The public body conducting the auction collects enough ERCs from interested producers to justify holding an auction. The public body publicizes the auction and what is being offered as well as the conditions of sale. It then announces an initial (relatively high) price per unit for the ERCs, and invites orders at that price. If a full subscription is not obtained, all the orders are returned, a new lower price is announced, and the process of receiving bids is begun anew. The process is repeated until a full subscription is obtained. It is possible to avoid multiple steps by using a schedule-of-payment order—the bidders indicate how many ERCs they want at each of several alternative prices, and the first price for which all ERCs are ordered is the overall unit sales price.

The "English" Auction System

This alternative is similar to that used for the sale of U.S. Treasury bills. Blocks of ERCs would be auctioned serially until all were gone. The blocks would be uniform (e.g., 10 ERCs per block), but the price would not. The first block sold would probably bring a higher price (from a bidder who needs them more than bidders at lower prices) than the last block sold. One difficulty involved is the meaning of a

"uniform block". As noted above, because the ratio of offsets required to ensure reasonable further progress may vary, B's purchase of 10 ERCs created by A may not enable B to increase its emissions as much as if C had purchased the same 10 ERCs. Therefore, uniform block can have two meanings:

- **Uniformity, as determined at the producing source** (i.e., if the block is to be 10 ERCs, then regardless of bidders' characteristics, they will have to buy 10 ERCs as measured at the producing source); and

- **Uniformity, as determined at the buying source** (i.e., if the block is to be 10 ERCs, then buyers must buy in blocks of ERCs that are commensurate to an increase of 10 emission units at the buying source—this may require the purchase of fewer than 10, more than 10, or 10 ERCs as measured at the producing source).

The latter option presents some substantial administrative hurdles which, practically, require that only the same class of bidders be permitted to participate in any one auction.

The "Traditional" Auction System

This system responds more to the specific character of an ERC as a commodity, i.e., each block of emission reductions has relatively unique characteristics (e.g., pollutant size and location) and because

of dispersion factors, will affect potential buyers differently. What is offered for sale is the ERC as created by any one producer. The "blocks" in the traditional auction are individual "lots" of ERCs either consigned or bought outright, and therefore would not be uniform. This system would be similar to that used in auctioning oil leases. Oil lease tracts are not uniform in size, and may vary in value from bidder-to-bidder based on considerations such as proximity to other oil lease tracts held by the particular bidder. In an ERC auction, a particular block might be worth more to a buyer source close to a producer source than to a buyer located further away. Thus, ERCs would be offered "as is", and the bidder would have to buy enough blocks to cover its needs. (This suggests that a bidder will sometimes have to buy more ERCs than it actually needs simply because no one block had the exact amount of ERCs needed by the buyer source.) In this system, two considerations will dominate bid decision:

- how close is a particular ERC block to the number required by the bidder? (The possibility exists that the bid for a block which is relatively close to the number required will represent a high per unit price than a bid for a block which has many more ERCs than required. For example, if a bidder needs 19, it might offer more per unit for a block of 20 than for a block of 25.); and

- how much value the ERC has for the bidder (i.e., is it a block which can be used

almost one-for-one to allow increased emissions? As discussed above, the closer the producer/seller source is to the buyer source, the more likely is the one-for-one correspondence).

Advantages. There are a number of advantages in using some form of the auction. They are detailed below:

- **Administrative Efficiency:** The auction is a convenient method of handling the sale of ERCs. Instead of proceeding in a piecemeal, transaction-by-transaction fashion, the sale effort can be focused on relatively few points in time. The administrative burden is thereby reduced.

- **Transaction Costs:** The parties involved (producer/seller, public authority, and buyer) will have minimal transaction costs. There is little, if any, negotiation required. Information is easy to obtain, and the actual sale normally will not be a protracted event. (However, in the "Dutch" system, if a schedule-of-payment variation is not used, the actual sale could be a very time-consuming transaction. Avoiding such delay is a strong advantage of the schedule-of-payment variation.)

- **Market-Clearing Price.** This price is easy to determine in the auction program, whether available ERCs are sold simultaneously (as in the "Dutch" system) or whether ERCs are sold serially (as in the other two variations). The market is defined as that group of potential bidders who are

actually qualified/certified to participate in the auction (rather than defining it as the group of bidders who would participate if there were no barriers to entry). The auction system also focuses the bidders' attention on the demand for ERCs. This helps bidders to assess not just what they want to pay for the ERCs, but what they will have to pay in order to win the bidding competition for these scarce ERCs.

- **Promoting Clean Air.** It is possible that an auction system may inadvertently result in additional improvement in clean air. If a buyer must bid on blocks of ERCs, it may end up buying more than it wants—this means some ERCs will exist, at least for a while, which may not be used. This maintains cleaner air than would be required. Of course, the source which bought too many would try to sell the excess through the auction system, but that source would then have to meet the seller qualifications set by the public authority. Even if the buyer of too many ERCs would resell them through the auction system, there would be that temporary cushion of excess ERCs—and this "temporary" cushion might remain fairly constant from auction-to-auction with the only change being the identity of the source providing the cushion.

Disadvantages. There are also disadvantages in selecting one of the variations of the auction system. These are noted below along with some possible remedial measures.

What are the Characteristics of the Public Monopoly Monopsony System?

● **Time Inflexibility.** To be efficient (one of its major advantages), an auction of ERCs probably will not be held with great frequency. It is not impossible for an auction system to operate with frequency (for example, the auction of Treasury bills is held weekly), but the demand and supply must be sufficiently high to justify frequency. This may not be true of the market for ERCs. This time inflexibility inhibits immediate purchase to satisfy ERC needs as they arise. However, this disadvantage probably is not great since the technical preparation and planning for the purchase and use of an ERC ordinarily will require lengthy periods of time during which it is likely that an auction will occur. The frequency of auctions will in part be determined by the thinness of the market for ERCs

● **Block Inflexibility.** If a buyer source must buy blocks of ERCs, it will often be forced to buy more ERCs than it needs. While beneficial from a clean air standpoint, this will inhibit economic growth (by unnecessarily limiting the supply of ERCs). This can be avoided in both the "Dutch" and "English" systems (but not in the "Traditional" system) by defining "block" to be one unit of ERC.

● **Classes of Buyers.** When there are different classes of buyers, it is more difficult to establish their credentials than when there is only one class. It should be noted, however, that multiple classes of buyers detract from the administrative efficiency advantages noted

above. In a banking and trading system, however, this disadvantage seems unavoidable—and it is a disadvantage for all three banking and trading alternatives being considered.

● **Sell-out Requirements.** If the ERCs on auction are required to be sold out, significant delays in the sale of ERCs occur. The "Dutch" system is the only auction variation which has this requirement, and it is a significant deterrent for selecting that variation. Not only are time delays encountered, but such a policy could lead to a short-term price that did not reflect the value of the credit over the long-term. It is possible to modify the "Dutch" system to include a minimum bid which, if reached without attaining full subscription, would be the final price acceptable—those orders at that price would be filled and the unsold portion would be kept until the next auction.

Summary. The systems described offer flexible opportunities to provide the means of using the auction concept to allocate ERCs. The three variations presented above are not rigid, and it would be possible for an entirely new variation to be created by combining different aspects of the three. In addition to the specific advantages and disadvantages of the auction, *per se*, the variations also exhibit the advantages and disadvantages of the public option, discussed generally at the beginning of this part of the paper.

This second public option gives the banking and trading authority (as noted above, this is not necessarily a public body) extensive control over the sale and purchase of emission reduction credits. In essence, the banking and trading authority exercised great influence over the entire process of banking and trading emission reductions—from production to final sale. Production is influenced by the price at which the public authority purchases the ERCs, and the sale (and subsequent economic growth) also is influenced by the price which the banking and trading authority charges the buying sources. This is not to say, however, that the banking and trading authority is the sole motivating force to production and sale of ERCs. Control technologies are not so precise that a source will invariably comply precisely with its permit requirements. As a result of its compliance efforts, a source might "inadvertently" create ERCs which it then would try to sell to the banking and trading authority. Similarly, a buyer's need for ERCs might be of such a nature that the price is not much of an object. In both these situations, the activities of the banking and trading authority in setting sale and purchase prices would not affect the sources' incentive to create or purchase ERCs. As in the public auction system, the public body will have a role that extends, at least, to regulating who may produce, sell, and purchase ERCs as well as other related issues.

Description. A banking and trading authority would serve as the sole purchaser of ERCs

from producers and the sole supplier of ERCs to buyers. Both the banking and trading authority and the public body (if different) would engage (to varying degrees) in several administrative duties. Included in these duties are the following:

● **Publicity**—the banking and trading authority and the public body would disseminate information about the ERC trading system. Possible mediums of communication include special information packets, advertising in newspapers, advertising in trade/industry journals, conducting seminars, and so on.

● **Explaining the mechanics of the trading system**—this could be covered in the publicity, but it seems more effective to direct these explanatory efforts to sources which express an interest in participating in this trading system. The explanation could be on a large scale (e.g., by using a packet of information and conducting outreach seminars and meetings on the topic) or on a one-on-one basis (i.e., in dealing with producer/sellers and buyers, one of the first things done would be some kind of conference during which the rules and regulations of the trading system were explained). These efforts could be coordinated with the APCA, Chamber of Commerce, economic development agency, or could be undertaken independently by the banking and trading entity.

● **Determining the eligibility of producer/sellers and buyers**—this is another administrative task which must be taken care of early in the trading transaction. As noted in the discussion of auctions, establishing the eligibility of participants can be quite complicated. It can be executed in at least two different ways—the potential participant can submit documentation prior to beginning the trading process, and eligibility and demonstration of attainment requirements can be determined before the process continues; or an eligibility and demonstration of attainment determination can be made on a one-on-one basis during the initial stages of the trading process. This latter alternative involves personal communication, technical evaluations, documentation, and the like. Of course, a combination of the two alternatives is possible.

The banking and trading authority determines at what price it will buy ERCs and at what price it will sell ERCs. In this sense, then, the authority is the sole buyer (monopsonist) and the sole seller (monopolist). Although the authority's position suggests that it can dictate these two prices (purchase and sale), its actual power to do so is constrained. The authority cannot dictate the behavior of the market. Quite simply, if it is paying too little for ERCs, sources will not go to the expense of creating them, or if a source does reduce emissions, it will not go through the process of converting those reductions into ERCs. Presumably, a producing source can back out of the process anytime before its permit is changed to reflect the emission reductions on which its ERCs are based. In such an instance, the source could maintain the documentation of its reduction and wait to convert into ERCs until the ERC market appears more favorable, or until the producing source decides it must use or dispose of the emission reductions. Alternatively, if the selling price is too high, sources wishing to expand or build simply will decide to cancel or postpone their plans, or to seek a different location. Thus, the banking and trading authority's power is constrained by market considerations.

The banking and trading authority also needs some mechanism for determining what is to be charged in each sale and what is to be paid for each purchase. A major issue is whether or not these prices should be uniform. It is possible to use differential pricing as a means to regulate entry and participation in the system. For example, the authority might pay reduced prices for ERCs which result from plant shutdowns or from plants just now coming into compliance. Differential pricing, however, could present serious legal difficulties,¹ and it would certainly place a substantial administrative strain on the authority's controlling the banking and trading system. In determining the price charged or asked, there may be room for negotiation between the authority and the buyers and sellers. The extent of this negotiation is set at the discretion of the banking and trading authority. Negotiation is attractive in that it may permit some transactions to occur which would not have been consummated otherwise. However, it also can introduce delay, added administrative cost, and unbridled administrative discretion to this banking and trading system.

¹Differential pricing raises the issue of equal protection. Unless there is a rational relationship between the action taken and the regulatory purpose, the action can be successfully attacked. If it is shown that a differential price is used as a punitive measure for past behavior, it also is subject to attack. No attempt is made in this paper to explore or resolve these potential legal issues.

Advantages. There are several attractive advantages to this public option, which are discussed as follows.

● **Time flexibility.** The monopoly/monopsony (M/M) alternative provides a continuous opportunity for buyer sources to obtain ERCs. Instead of waiting for a periodic opportunity to purchase ERCs, the buyer source can obtain them as necessary. This also benefits the banking and trading authority which does not have to concern itself with selling out an entire subscription or with what to do with ERCs in the interim between sales.

● **Achievement of social goals.** Although this is an advantage of all public banking and trading options, the M/M system is particularly adaptable in order to achieve these goals. By manipulating prices paid and asked, the banking and trading authority administering the system has a quick and efficient tool for achieving societal policies—i.e., rather than issuing flat prohibitions to sources which have not cooperated in the past, the authority can merely place an appropriate premium on that source's participation. This does not preclude the current participation/cooperation of the source, but does force it (as the price of participation) to demonstrate good faith in light of its past misdeeds.

● **Efficiency in the transaction.**

This advantage encompasses reduced transaction costs, but goes beyond that. Buyers and sellers save time and effort in selling and seeking ERCs because there is only one purchaser and one supplier—the banking and trading authority. In addition to this, the banking and trading authority system avoids the need for oversight and regulation of many private brokers. Although such regulation is not a *sine qua non* of the private system, it is a probably outgrowth of such a system. Since in the M/M system, there is only one broker, this oversight/regulatory duty is diminished substantially and public resources are conserved.

● **Market certainty.** The certainty imparted to the market by the M/M system goes beyond mere stability. The M/M does provide stability, but it also assures the producer/seller that there will be a buyer. Since the ERC created by the producer is sold to the banking and trading authority, the producer does not have to be concerned with the possibility of a no-sale.

● **Block flexibility.** It is possible in the M/M system to sell to the buying source that exact amount of ERCs it needs. The banking and trading authority can tailor the blocks available to a buying source to reflect any discounts to be imposed on the buyer.

● **Allocation of attainment**

burden: The M/M system can be used to allocate the cost of achieving attainment. Instead of placing the full burden on new sources, the M/M system could arrange to give ERCs to new sources. ERCs could be financed through a tax levied proportionately on all major sources of pollution or they could be acquired by imposing further reductions on existing sources.

Disadvantages. Some of the disadvantages of selecting an M/M banking and trading system are described as follows.

● **The nature of monopoly and monopsony to producing and buying sources.** In the M/M system, the various sources must deal with the banking and trading authority, or else abstain from participation in the banking and trading system. If the authority appears intransigent to a producer/seller or buyer, there is no other purchaser or supplier with whom to deal. This dominant position of the authority can lead to a certain insensitivity about the concerns of producer/sellers and buyers. Although this is not inevitable, it is a possible development to guard against. As noted in the description, though, the authority's power is not unconstrained, and the purpose of a trading and banking system (to permit economic growth while improving air quality) should mitigate against the tendency of the authority to become isolated from the needs of the sources it serves.

● **Non-market price.** It will be difficult for the banking and trading authority to determine the market clearing price. There is no easy mechanism for determining the price as there was in the auction alternative. The authority can proceed in an iterative fashion to adjust the price charged until it is able to sell all ERCs, but this is an inexact and time-consuming process. On the other hand, the authority may not be overly concerned with finding and charging the market price, and may concentrate instead on other goals. The issue is whether the authority can determine the price of ERCs so that both economic efficiency and related goals of trading and banking are promoted.

● **Administrative burdens.** The use of discriminatory pricing (and payment), aside from difficult legal issues, would create tremendous administrative problems. When a transaction deviates from the payment/charge usually made, special attention will have to be given to the transaction—to determine if such a deviation is justified, to decide what the difference in payment/charge should be, and to document the decision. If such instances are relatively rare, the M/M system will be able to absorb the disruption caused much more readily than if they occur as a matter of course.

● **Classes of buyers.**

Classifying buyers according to the effect a particular ERC has on the air quality in the buyer's area is another substantial administrative burden. However, in order for the trading and banking system to operate in a fashion that ensures the achievement of reasonable further progress, this is an essential requirement to comply with the Clean Air Act, and one which, in one way or another, must be performed in all three of the alternative systems.

● **Administrative inefficiency.**

Since the sales process is continuous, it is necessary to maintain constantly the administrative apparatus to conduct the sales transactions. This could be avoided in the auction system since sales occurred only at specified intervals. This disadvantage does not apply to the purchase of ERCs since all three systems contemplate continuous or open-ended purchasing (or consignment) of ERCs.

What are the Characteristics of the Private Trading System?

● **Unbridled discretion.** The M/M system raises the possibility that the banking and trading authority will be given too much power. Failure to hold it accountable for its activities fosters a climate conducive to favoritism, or even corruption.

Summary. The M/M system provides greater flexibility than the auction system, but introduces some elements which create greater administrative burdens. Although greater flexibility exists for the banking and trading authority producer/seller and buyer sources may face greater constraints in disposing of and purchasing ERCs.

The alternative to a "public" system is a "private" system—one in which government participation is kept to a minimum. In an area such as emissions control, it is impossible and undesirable to bar all government involvement, but a private trading system would limit the government to its current responsibilities (e.g., setting emission standards in the SIPs, monitoring and enforcement activities). In addition, the APCA would be required to certify the creation and use of emission reductions and ensure that all transactions satisfied the demonstration of attainment rule.

Description. The private trading system encompasses a variety of options which all share the characteristics of being dominated by private parties and concerns rather than government regulatory bodies. Two major design options dominate this system:

● The *direction transaction* in which the buyer and seller deal face-to-face; and

● The *middleman transaction* in which the transfer of ERCs is accomplished through the office of some private middleman or brokering organization.

The most likely scenario would involve a source that wished to expand or locate in an area. That source, needing ERCs to accomplish its planned expansion, would turn to some middleman which had ERCs to sell. If there were not enough ERCs on hand, the middleman would try to negotiate a price for ERCs which would induce their production by some existing source. Assuming that the market was big enough, a middleman would probably find it worthwhile to develop a stock of ERCs—whether through purchase or "consignment"—so that a buyer could be readily accommodated. This development would, of necessity, involve speculation. As the incentive for middleman participation, there must be the expectation of a reasonable profit.

The concept of a middleman, however, suggests that a market is fairly well developed in the initial stages of a banking and trading system, this would not necessarily be the case. As a result, there may be more direct transactions in the early stages of the banking and trading system. In fact, under the existing emissions offset policy, the overwhelming number of completed offset arrangements were produced internally at facilities owned by the same source seeking to expand.

The size of the market does not necessarily dictate whether or not a middleman can operate in it. There may develop several regional or national middlemen firms who maintain local market information and therefore can efficiently service a small market that could not provide enough activity to support a permanent local middleman organization.

A private trading system can involve varying degrees of government involvement. Access to the ERC market could be unregulated, except insofar as existing laws (e.g., antitrust laws) restricted the sources which would participate. On the other hand, eligibility requirements could be set which limited the sources which could participate in the creation, sale, and purchase of ERCs. In a very real sense, this power to control market entry is inherent in the public authority's power over verification of emission reductions and changes in source permits and the SIP. Similarly, the public body could exercise varying degrees of control over any middleman organization. Such control could range from a *laissez faire* attitude, to simple registration requirements, to strict licensing, reporting, and oversight activities. Insofar as discounts, adjustments, and taxes have to be assessed, government involvement is unavoidable.

There is one area which probably will be left entirely to the private parties—price. The prices for ERCs will be determined by the parties involved, with no minimum and no maximum. Yet, it is an option for the public body to set price guidelines which would establish ceilings and floors for prices. However, if government involvement became so detailed that it determined the price, controlled access to the market, and exercised strict oversight of each transaction, much, if not all, of the rationale for a private system would have been preempted. In such a situation, it is better to conclude the *de facto* nature of the system, and call it a “public” rather than “private” system.

Advantages. The private system’s advantages are

- **Limited government resources required.** Limited activity on the part of the public authority will conserve public resources relative to the resources which must be expended in the two “public” alternatives; the private system, to a great extent, runs on its own fuel.

- **Limited administrative burdens.** Since government regulation is kept to a minimum, resource-consuming efforts to satisfy the administrative burden usually generated by such regulation would be avoided. The effect of this advantage may not be great, because there will be strict government control over the documentation, verification, and maintenance of recorded emission reductions. The administrative burdens imposed by this control cannot be avoided.

- **Market price.** If government intervention in price setting is avoided, the price charged for ERCs should reflect a relatively accurate market price.

- **Incentive to produce and trade ERCs.** The private system allows the appropriate economic signals to be sent in encouraging or discouraging the production and trading of ERCs. If the demand is low, the price will drop as will production. The system will not produce (at least ideally it will not) ERCs that cannot be justified from an economic standpoint.

- **Timing of Availability.** ERCs will be available without any time restriction. That is, the on-hand supply may not always satisfy the current demand, but there is no waiting period once the ERCs are created. Of course, there will be the delays experienced in every system—having changes made in the SIP and source permits.

- **Block flexibility.** The buying source will be able to negotiate for precisely the amount of ERCs it needs. This permits efficient use and allocation of ERCs so that the maximum allowable economic growth can occur.

The extent of these advantages is heavily dependent on the degree of government involvement in the private system. Many of the advantages mentioned are predicated on relatively little involvement by the public authority (i.e., the public body would perform only those activities which must be performed by the government). As the degree of government involvement rises, these advantages diminish.

Disadvantages. The private system has several drawbacks which are discussed, below.

- **High transaction costs.** The private transaction, whether through a middleman or direct, may require fairly substantial transaction costs as compared with the “public” alternatives. The purchaser/supplier of ERCs must be sought, and negotiated with instead of being readily apparent and available. This search requires the participating firm to expend its own resources in a direct transaction, and to pay a middleman in the non-direct transactions.

- **Abuse potential.** When there are primarily private actors participating in the transaction process, the potential for abuse rises. When the government holds the reins of the actual transaction process, it is much easier to guard against abuse than when it exercises an oversight function of many different private sectors.

Combinations

● *Duplication of effort* If the private system requires substantial government involvement, it might be more efficient to allow the public authority to operate the banking and trading system. There either will be overlap in function, or the public body will be performing most of the essential tasks. In either case, it probably should be asked whether a "public" system would be a more efficient use of resources.

● *Uncertainty* There is an element of uncertainty in the private system that is not present in the public systems. Especially during the initial stage of a market's operation, the private system will have to "feel" its way to stability. Because the public systems have governmental underpinning, much of this instability is avoided. Of course, in a private market, there are more risks involved than in a publicly controlled market (as evidenced by the presence of speculators in the private market), but that is merely a characteristic of the private market place.

● *Market Imperfections* The private system will exhibit some market imperfections which realistically affect any private market and keep it from responding precisely in accord with economic theory. A good example of this is imperfect information. In a public system, all the information about prices is readily available from the public authority (actually, the issue is somewhat meaningless in those situations where the public body sets the price)—the buyer source knows what is available and what its own needs are and can make an informal decision on what to pay. However, in the private system, there is no guarantee that the buyer source will be aware of the full supply picture, and an improper decision about what price to pay for ERCs might ensue.

Summary. The private system provides greater freedom and flexibility in satisfying a source's needs for ERCs. However, it offers less certainty to the participant, posing risks avoided by the public systems.

It is possible for states or locales to decide that there are characteristics of each of these options that are desirable, and that a combination of these three options is preferable to selecting only one of the three. For example, it is possible to use the private trading system, but limit to some degree who may participate. Or, use the monopsony portion of the public option for collecting ERCs for sale, but use the auction system to dispose of the ERCs. The intent of combinations is to fashion an alternative that is suited to the needs of a particular banking and trading locale—since local and state conditions vary considerably, it is reasonable to assume that the combinations selected would also exhibit variation.