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IN THE UNITED STATES COURT OF APPEALS
FOR THE THIRD CIRCUIT

No. 79-2567

TENNECO CHEMICALS, INC., Petitioner,

v.

ECKARDT C. BECK and UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY, Respondents.

On Petition for Review of Administrative
Orders Issued by the Environmental Protection Agency

BRIEF FOR PETITIONER

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JURISDICTIONAL STATEMENT

This Court has jurisdiction over the present petition under Section 307(b)(1) of the Clean Air Act, as amended, (the "Clean Air Act" or the "Act"), 42 U.S.C. § 7607(b)(1).

ISSUES PRESENTED

(1) Whether this Court has jurisdiction to review final administrative orders issued pursuant to 40 C.F.R.

§ 61.65(a) and Sections 112 and 113(a)(3) of the Clean Air Act.

(2) Whether EPA's purported withdrawal of the administrative orders under review, after the filing of the petition for review, which withdrawal was not unconditional, defeats this Court's jurisdiction and renders the case moot.

(3) Whether EPA properly applied the applicable regulation, 40 C.F.R. § 61.65(a), when it made its determination to issue the orders under review.

(4) Whether there was an adequate factual basis in the record for the EPA findings that Tenneco violated 40 C.F.R. § 61.65(a), or whether the EPA findings were arbitrary, capricious, an abuse of discretion and not otherwise in accordance with the law.

STATEMENT OF THE CASE

A. Nature of the Case

The present petition seeks judicial review of two administrative orders, dated July 2, 1979 (the "Orders"),^{1/} issued by the Environmental Protection Agency ("EPA" or the "Agency") against Tenneco Chemicals, Inc. ("Tenneco"). The Orders stated that Tenneco had violated Section 112 of the Clean Air Act and 40 C.F.R. § 61.65(a) by discharging certain quantities of vinyl chloride through relief valves at two of Tenneco's polyvinyl chloride plants located in Burlington and Flemington, New Jersey.^{2/} As a result, the Orders directed Tenneco to take such immediate steps as were necessary to prevent any further "violations" and to "immediately and at all times hereafter comply with the requirements of 40 C.F.R. § 61.65(a)"^{3/} Tenneco was further advised that a violation of the Orders would subject it to a civil action for an injunction and penalties of up to \$25,000 per day of violation and possible criminal liability for a knowing violation.^{4/}

It is Tenneco's contention that EPA's findings were based upon an incorrect interpretation of 40 C.F.R. § 61.65(a),

^{1/} See Orders, In the Matter of Tenneco Chemicals, Inc. (Index Nos. 90146 and 90147), July 2, 1979, R. 1 and 2, App. 4-6 and 10-11.

^{2/} Id. at 1-2, App. 4-5 and 10-11.

^{3/} Id. at 2-3 and 2, App. 4-5 and 11.

^{4/} See Letters from S. Dvorkin to R.R. Neugold, dated July 2, 1979, R. 1 and 2 at 2, App. 2 and 8.

which exempts "emergency" relief discharges from the general prohibition against relief valve discharges to the atmosphere.^{5/} EPA's interpretation, for enforcement purposes, of what constitutes an "emergency" relief discharge has been set forth in a series of internal agency memoranda (the "Memoranda") issued between February 23, 1978 and April 24, 1979 by EPA's Division of Stationary Source Enforcement ("DSSE") to the Regional Enforcement Directors.^{6/} The interpretation adopted by the Agency is not warranted by the language of the regulation, and in effect, tends to establish a new and different regulation governing emergency relief discharges.

B. Events Prior to the Issuance of the Orders Under Review

1. The Vinyl Chloride Standard

Section 112 of the Clean Air Act authorizes EPA to establish national emission standards for hazardous air pollutants. 42 U.S.C. § 7412. Pursuant to this section EPA promulgated the National Emission Standard for Vinyl Chloride (the "Vinyl Chloride Standard" or the "Standard"), 40 C.F.R. § 61.60 et seq., on October 21, 1976^{7/} to control emissions

^{5/} Id.

^{6/} R. 41, 45 and 47-49, App. 68-70, 79 and 84-90.

^{7/} 41 Fed. Reg. 46,560-73 (1976), App. 142-55. The Standard became effective immediately upon promulgation, but most, if not all, then-existing sources received statutory waivers from EPA permitting delayed compliance in order to allow industry sufficient time to take control measures mandated by the Standard. 42 U.S.C. § 7412(c)(1)(B)(ii).

from industrial sources engaged in vinyl chloride production.^{8/}

The Vinyl Chloride Standard was promulgated in a rulemaking proceeding in accordance with required notice and comment procedures, and Tenneco, as well as other producers of polyvinyl chloride and vinyl chloride, participated in the proceedings. During the public comment period, Tenneco and other industry members submitted written comments on the proposed Standard and made oral presentations at the public hearing held on February 3, 1976.^{9/}

One of the topics covered by the proposed Standard was relief valve discharges.^{10/} Relief valves in polyvinyl chloride plants, as in other chemical plants, are used to prevent dangerous pressure buildups resulting from unplanned "runaway" reaction or other conditions. In the absence of such relief valves, vessels, piping or compressors could burst when the rated pressure on their walls is exceeded. The danger is not unlike that of a pressure cooker, which can burst violently if over-pressured. Equipment containing vinyl chloride monomer results in heightened danger, because vinyl

^{8/} The Standard applies to the production of vinyl chloride, polyvinyl chloride and ethylene dichloride.

^{9/} See Standard Support and Environmental Impact Statement, Volume 2: Promulgated Emission Standard for Vinyl Chloride, EPA-450/2-75-009b (September 1976) (the "Standard Support Document"), R. 46, App. 80-83.

^{10/} 40 Fed. Reg. 59,545 (1975), App. 134.

chloride, a gas at ambient temperature, is extremely combustible at low levels of concentration in air. These facts explain the industry's concern with any measures which would tend to contain vinyl chloride monomer in over-pressure situations.^{11/}

When it was originally proposed, the Standard prohibited all relief valve discharges to the atmosphere, except for emergency discharges. The proposed Standard went on to define an emergency relief discharge as one "which could not have been avoided by taking all available measures to prevent the discharge." Proposed 40 C.F.R. § 61.65(a) (emphasis added).^{12/}

In response to the comments made in the rulemaking proceeding, the Agency made a significant change in the section of the Standard relating to relief valve discharges. Specifically, as finally promulgated, the Standard states:

"Except for an emergency relief discharge, there is to be no discharge to the atmosphere from any relief valve on any equipment in vinyl chloride service. An emergency relief discharge means a discharge which could not have been avoided by taking measures to prevent the discharge." 40 C.F.R. § 61.65(a).

The Standard does not provide any further explanation of what constitutes an emergency relief discharge, nor does it prescribe

^{11/} For background for the Court, Tenneco has included in the Addendum herein copies of pages from two engineering publications dealing with relief valves.

^{12/} 40 Fed. Reg. 59,545 (1975), App. 134.

any specific measures that a facility must adopt to prevent relief valve discharges. This is in contrast to other provisions of the Standard which do specify measures a source must take to control vinyl chloride emissions. See 40 C.F.R. § 61.65(b).

The critical fact, however, is that the Agency, in response to comments about its proposal on relief valve discharges, deleted the language requiring that "all available" measures be taken to avoid such discharges.

In addition, the Standard is silent on the procedures which the Agency must follow in determining whether or not a particular relief valve discharge could not have been avoided and is therefore a permissible emergency discharge. Written material accompanying both the proposed and final Standard makes it clear that a factual determination would be made in each situation on a case-by-case basis. Specifically, the preamble to the proposed Standard states:

"Discharges which cannot be avoided . . . will not be in violation of the proposed standard if the owner or operator notifies EPA within 10 days concerning the nature and cause of the discharge. This notification provision is necessary to permit EPA to investigate the surrounding conditions and determine whether the discharge could have been prevented." 40 Fed. Reg. 59,539 (1975) (emphasis added).

Similarly, the Agency accompanied the promulgation of the final Standard with a response to various comments made during the rulemaking proceeding. In responding to a comment concerning the preventability of relief valve discharges caused by operator error, EPA stated:

"Whether an operator error will be considered preventable or not will have to be decided on an individual basis depending on the surrounding circumstances. Examples of preventable operator errors would be errors due to lack of training or negligence." Standard Support Document, R. 46 at 2-47, App. 80.

Without contradictions, therefore, both the proposed Standard and the final Standard contemplated that EPA would make an individual determination each time there was a relief valve discharge, as to whether or not there had been a violation of the Standard.

2. The DSSE Memoranda

Beginning in February 1978, DSSE, the enforcement arm of the Agency, issued five memoranda to EPA's Regional Enforcement Directors concerning the application and enforcement of the Standard's relief valve discharge provisions.^{13/} The Memoranda set forth, inter alia, the following rules, which were not contained in the Standard itself:

- 1) A relief valve discharge will be considered an emergency discharge only if it occurs as the result of an unpreventable disaster (i.e., tornado, hurricane, earthquake, flood, riot, sabotage, etc.). (May 18, 1978 DSSE Memorandum, R. 47, App. 84.)
- 2) After experiencing an initial discharge, companies can reasonably be expected to (a) properly instrument reactors to detect upset conditions, (b) inject chemicals to stop the polymerization reaction during upset conditions,

^{13/} The Memoranda were dated February 23 and 28, May 18 and October 26, 1978, and April 24, 1979. See R. 41, 45 and 47-49, App. 68-70, 79 and 84-90.

(c) vent the reactor contents to a gasholder during upset conditions and ultimately to a recovery system, (d) provide employees with improved training on preventing and handling upset conditions, and (e) maintain a backup source of power. (April 24, 1979 DSSE Memorandum, R. 41, App. 69-70.)

- 3) When a source reports a relief valve discharge, the Agency will presume that the discharge was not due to an emergency, but was preventable; and, therefore, that the discharge constitutes a violation of Section 61.65(a). (April 24, 1979 DSSE Memorandum, R. 41, App. 68.)

3. Tenneco's Discharge Reports

Tenneco manufactures polyvinyl chloride at two plants located in Burlington and Flemington, New Jersey. The manufacturing process is automated for the most part. During the operation of these plants, between 1977 and mid-1979, relief valve discharges occasionally occurred. In each instance Tenneco reported the discharges to EPA's Region II in accordance with the requirements of 40 C.F.R. § 61.65(a).

The discharge reports^{14/} set forth the identifiable cause of the discharge and corrective measures which Tenneco was undertaking to prevent or contain future similar problems.^{15/} In some instances the discharges were due to unexpected instrumentation malfunction,^{16/} failure of rupture discs below the designated pressure,^{17/} and ice blockages in the condenser

^{14/} R. 4-21, App. 19-38.

^{15/} Id.

^{16/} R. 20 and 21, App. 36-38.

^{17/} R. 20, App. 36.

discharge line due to meteorological conditions.^{18/} On only two occasions (out of a total eighteen discharges) was the discharge due to an operator error.^{19/}

During the entire period from the filing of the reports until Tenneco's receipt of the Orders under review, EPA never communicated to Tenneco its concerns with respect to the discharges. Nor did the Agency request any further information from Tenneco concerning any discharge or its cause. The Orders were issued solely on the basis of Tenneco's reports which contained the conclusory information required by the Standard. EPA took this course of action despite its previously cited intended policy of investigating each discharge on a case-by-case basis before determining whether a particular discharge was non-emergency, and therefore a violation.^{20/}

C. EPA's Administrative Orders of July 2, 1979

EPA issued two Orders^{21/} to Tenneco on July 2, 1979, claiming that Tenneco, in the operation of its polyvinyl chloride plants at Burlington and Flemington, New Jersey, violated Section 112 of the Act and 40 C.F.R. § 61.65(a). The Orders were based upon fifteen relief valve discharges at the Burlington facility and three relief valve discharges at the

^{18/} R. 15, App. 30.

^{19/} R. 13 and 19, App. 28 and 35.

^{20/} Supra at 7.

^{21/} R. 1 and 2, App. 4-6 and 10-11.

Flemington facility, all of which according to EPA were "under non-emergency conditions."^{22/}

In the accompanying letters from the Acting Director of the Enforcement Division,^{23/} EPA stated that the basis for its findings was a narrow construction of what constitutes an emergency relief discharge.^{24/} Echoing the positions outlined in the above-cited DSSE Memoranda and even employing some of the same language of one of the Memoranda, EPA asserted that:

"As a minimum, the source must demonstrate that the discharge could not have been prevented by implementing any of the following procedures:

- 1) employee training programs including instruction on emergency procedures;
- 2) proper inspection and maintenance programs (including replacement of relief valve seals on a sufficiently frequent basis in order to prevent their rupture);
- 3) proper design and operation of process and control equipment; and
- 4) installation and operation of all control equipment needed to comply with the vinyl chloride standard.^{25/}

The letters went on to state that violation of the Orders would subject Tenneco "to a civil action for an injunction and

^{22/} Id. at 1, App. 4 and 10.

^{23/} R. 1 and 2, App. 1-3 and 7-9.

^{24/} Id. at 1, App. 1 and 7.

^{25/} Id. at 1-2, App. 1-2 and 7-8; compare R. 41 at 1, App. 68 with the above-quoted language contained in the transmittal letters.

penalties of up to \$25,000 per day of violation" and possible criminal liability for a "knowing violation" of the Orders.^{26/}

In interpreting 40 C.F.R. § 61.65(a) in a way which would justify the issuance of the Orders, EPA plainly relied upon the position set forth in the various DSSE Memoranda. As stated in an EPA internal memorandum, dated March 26, 1979,^{27/} recommending the issuance of the Orders under review against Tenneco:

"A list of the discharges [from four companies' plants including Tenneco] is attached, showing the dates and estimated VCM emissions. These discharges were all 'preventable' and did not occur as the result of an 'unpreventable disaster' as defined in policy memoranda issued by Edward E. Reich, Director, DSSE on May 18, 1978 and October 26, 1978. They should be considered violations of 40 C.F.R. Part 61.65(a) and subject to enforcement sanctions under section 113 of the Clean Air Act."^{28/}

No other rationale was given for the issuance of the Orders. Moreover, EPA made no effort to make any factual investigation as to the circumstances surrounding the discharges. Instead the Agency had before it only Tenneco's conclusory reports, as required by the Standard, that discharges had occurred. With that and nothing else, the Agency decided that the Standard had been violated.

^{26/} Id. at 2, App. 2 and 8.

^{27/} Memorandum from J. H. Menczel to S.A. Dvorkin, dated March 26, 1979, R. 40, App. 64.

^{28/} Id.

D. Proceedings in this Court

1. Appeal of the Administrative Orders

On August 30, 1979, Tenneco filed a petition for review of the Orders in the United States Court of Appeals for the Second Circuit.^{29/} Meanwhile, earlier the same day, Hooker Chemical Company, RUCO Division ("Hooker"), filed in this Court a petition for review of an administrative order, issued by EPA also on July 2, 1979, which order was analogous to the Orders issued against Tenneco.^{30/}

Because the orders under review in both proceedings were essentially identical, were issued by the same EPA officer on the same date, and apparently had arisen from the same problem at each of the plants in question, on September 7, 1979, Tenneco moved to transfer its appeal to this Court so that Tenneco's and Hooker's petitions could be resolved by the same court.^{31/} On October 30, 1979, the Second Circuit by order transferred Tenneco's action,^{32/} and on November 6, 1979, the action was docketed in this Court.^{33/}

^{29/} Petition for Review, Tenneco Chemicals, Inc. v. Eckardt C. Beck and United States Environmental Protection Agency, (Civil Action No. 79-4158), R. 54, App. 98.

^{30/} Petition for Review, Hooker Chemical Company, RUCO Division v. United States Environmental Protection Agency, Region II, (Civil Action No. 79-2194), R. 53, App. 97.

^{31/} Motion to Transfer Proceeding, Tenneco Chemicals, Inc. v. Beck, et al. (Civil Action No. 79-4158).

^{32/} Order, Tenneco Chemicals Inc. v. Beck, et al. (Civil Action No. 79-4158), R. 55, App. 105.

^{33/} Letter from T.F. Quinn to J.T.C. Hart, Esq., et al., R. 55, App. 106.

2. EPA's Purported Withdrawal of the Orders

In the meantime, on October 5, 1979, before the record in this case was filed, EPA sent out notices to Tenneco and Hooker purporting to withdraw the administrative orders which were the subject of their petitions for review.^{34/} However, in the letters accompanying the Withdrawal Orders, it was clear that the withdrawals did not constitute a reversal or a modification of EPA's original position that Tenneco and Hooker had violated 40 C.F.R. § 61.65(a).^{35/} As EPA stated:

"[I]n no event should this withdrawal be construed to relieve [Tenneco and Hooker] of liability for violations of the underlying regulatory provisions set forth at 40 C.F.R. § 61.65(a). In fact, it is EPA's continuing belief that [Tenneco and Hooker] ha[ve] violated the requirements of 40 C.F.R. § 61.65(a). EPA will take appropriate enforcement measures necessary to remedy any such violations which have occurred at the referenced polyvinyl chloride plant[s]."^{36/}

Thus, EPA attempted a mere technical withdrawal of the administrative orders in an attempt to defeat this Court's jurisdiction to review the Orders. EPA followed up the "withdrawals" with a motion to dismiss Tenneco's and Hooker's petitions on account of mootness, which motion was filed on

^{34/} Withdrawals of Orders, Index Nos. 90144, 90146 and 09147, App. 109 and 112.

^{35/} Letters from J. Morales-Sanchez to B.L. Harrison and to J.T.C. Hart, dated October 5, 1979, App. 110 and 107.

^{36/} Id.

December 6, 1979.^{37/} On January 9, 1980, a Motions Panel of this Court did not rule on the motion but instead, by order, referred the motion to the panel which will consider the petitions on the merits.^{38/}

^{37/} Motion to Dismiss, Tenneco Chemicals, Inc. v. Beck, et al. (Civil Action No. 79-2567) and Hooker Chemical Company v. EPA (Civil Action No. 79-2194).

^{38/} Order of January 9, 1980.

SUMMARY OF ARGUMENT

Whether viewed as orders under Section 112(c) of the Clean Air Act or simply as "final action," the Orders issued by EPA to Tenneco are reviewable by the courts of appeals pursuant to Section 307(b)(1) of the Act. The "withdrawal" of these administrative orders, subsequent to the filing of the petition for review in this case, did not render the case moot because there is a continuing underlying controversy.

Under 40 C.F.R. § 61.65(a), "emergency relief discharges" are exempt from the general prohibition against vinyl chloride equipment discharges. The Administrator, in the present case, did not properly apply the applicable regulation, when he determined that Tenneco's emergency relief discharges violated Section 112(c) of the Clean Air Act and 40 C.F.R. § 61.65(a). Instead the Administrator applied an approach developed in memoranda prepared by the enforcement branch of the Agency, which is contrary to the Standard, as promulgated.

Finally, the Administrator's findings, that Tenneco violated 40 C.F.R. § 61.65(a), were arbitrary, capricious, an abuse of discretion and not in accordance with the law because there was no factual basis in the record for such findings. The Administrator did not have an adequate factual record for making the determination required by the Standard. Moreover, the Orders themselves do not contain an adequate basis to support the findings made therein.

ARGUMENT

I. THE COURT OF APPEALS HAS SUBJECT MATTER JURISDICTION TO REVIEW THE ADMINISTRATIVE ORDERS ISSUED TO TENNECO.

There are two jurisdictional bases under which this Court can review the administrative orders issued to Tenneco. First, since the Orders were issued to enforce Section 112 (c)(1)(B) of the Clean Air Act,^{39/} Section 307(b)(1) grants explicit jurisdiction. It authorizes the courts of appeals to review "the Administrator's action in approving . . . any order . . . under Section 112(c)" ^{40/} Second, since in any event the Orders represent final Agency action, review of the Orders comes within the catch-all clause of Section 307(b)(1), which provides jurisdiction to review "any other final action of the Administrator under this Act" ^{41/}

Turning to the first of these bases of jurisdiction, one need go no further than the fact of the Orders to conclude that they are, indeed, orders issued under Section 112(c) and thus made explicitly reviewable by Section 307(b)(1). Both Orders specifically find that Tenneco owns and operates facilities "subject to the requirements of Section 112 of the Clean Air Act." ^{42/} In its ultimate finding, both Orders conclude

^{39/} 42 U.S.C. § 7412(c)(1)(B).

^{40/} 42 U.S.C. § 7607(b)(1).

^{41/} Id.

^{42/} Orders, supra, R. 1 and 2, App. 4 and 10.

that "Tenneco is in violation of 40 CFR § 61.65(a) and Section 112 of the Act."^{43/} There is, therefore, no question that the Orders are explicitly based upon alleged violations by Tenneco facilities of Section 112.

Although the Orders do not mention subsection (c) of Section 112 specifically, subsection (c) is the only portion of 112 which actually imposes legal requirements upon facilities. Subsection (a) of Section 112 sets forth definitions; subsection (b) describes the procedure for issuing emission standards for hazardous pollutants; subsection (d) deals with state implementation; and subsection (e) deals with alternatives to emission standards. Only subsection (c), and specifically subsection (c)(1)(B), imposes an operative legal requirement on Tenneco facilities. It states: "After the effective date of any emission standard under this section . . . no air pollutant to which such standard applies may be emitted from any stationary source in violation of such standard" It is obviously this substantive legal requirement which is being enforced by EPA in the Orders under review.

This conclusion is reinforced by the fact that Section 307(b)(1) provides separately for review of "any emission standard or requirement under Section 112 . . ." in the courts of appeals. The subsequent grant of jurisdiction to review "any order" under Section 112(c) must necessarily refer to an order enforcing the requirements of the subsection.

^{43/} Id.

Clearly, Congress intended that the courts of appeals review both aspects of the Clear Air Act's program for control of hazardous air pollutants, the issuance of the standards themselves and of "any order" issued by EPA to enforce the standards.

Even if it were assumed, for purposes of argument, that there was no explicit grant of jurisdiction to review an order enforcing a requirement of Section 112(c), jurisdiction would nonetheless exist under the catch-all clause of Section 307(b)(1), which provides for review in the courts of appeals of "any other final action of the Administrator under this Act" Although the Clean Air Act does not define the term "final action," the Orders under review are "final action" in every meaningful sense. The Orders speak in final, not tentative, terms. The Orders find the existence of specified violations and direct Tenneco to "immediately take such steps as are necessary" to come into compliance and to "immediately and at all times hereafter" comply with the emissions standard. The Orders conclude: "SO ORDERED, EFFECTIVE IMMEDIATELY." No further administrative appeals are specified or available.

The Orders issued to Tenneco, though made without an evidentiary hearing, would constitute "final agency action" within the meaning of Section 10(c) of the Administrative Procedure Act.^{44/} Red Lion Broadcasting Co. v. FCC, 395 U.S. 367, 372-73 n.3 (1969); National Automatic Laundry and Cleaning Council v. Shultz, 443 F.2d 689, 691-92, 698-99 (D.C. Cir.

^{44/} 5 U.S.C. § 704.

1971); Medical Committee for Human Rights v. SEC, 432 F.2d 659 (D.C. Cir. 1970), vacated on other grounds, 404 U.S. 403 (1972).

Jurisdiction is, therefore, clearly present for review of the Orders issued to Tenneco.

II. EPA'S PURPORTED WITHDRAWAL OF THE ADMINISTRATIVE ORDERS DOES NOT RENDER THIS CASE MOOT AND DEFEAT THE COURT'S JURISDICTION.

After Tenneco filed its petition for review but before the record had been filed with the Court, EPA suddenly, and without any explanation, withdrew its Orders on October 5, 1979.^{45/} The cover letter stated merely that the Agency had no intention to seek judicial relief against Tenneco for possible violations of the Orders, as distinguished from alleged violations of the emission standard. Indeed EPA did not preclude the possibility of taking enforcement action, such as the filing of a civil action, with respect to the very same relief valve discharges which were the basis for the Orders.^{46/} The Agency explicitly stated that "it is EPA's continuing belief that Tenneco has violated" the Standard and "will take appropriate enforcement measures."^{47/} In view of this statement, it is clear that the basic controversy between

^{45/} Withdrawal of Orders, supra, App. 109.

^{46/} Letters from J. Morales-Sanchez to B.L. Harrison and to J.T.C. Hart, supra, App. 110 and 107.

^{47/} Id.

-EPA and Tenneco, i.e., whether the discharges constituted a violation of the Standard, has not been resolved.

EPA, meanwhile, moved that this case be dismissed as moot.^{48/} The Agency argued that because the Orders, of which Tenneco sought judicial review, have been withdrawn by EPA, the controversy between the parties has become moot and the case should therefore be dismissed.^{49/}

In response to EPA's Motion to Dismiss, Tenneco submitted a memorandum arguing that in view of the threatening language which accompanied the purported withdrawal, the controversy between EPA and Tenneco is still very much alive, and that dismissal was not, therefore, justified under the applicable case law. There is no need to repeat the substance of Tenneco's argument contained in its opposition to the Agency's Motion to Dismiss. That pleading is already before this Court. Tenneco does wish to emphasize, however, that this Court's recent opinion in Dow Chemical Co. v. United States Environmental Protection Agency, 605 F.2d 673 (1979), is squarely on point. In the Dow case, EPA promulgated a rule; Dow filed a petition for review challenging EPA's statutory authority to promulgate the rule; and EPA then withdrew the rule. 605 F.2d at 676-77. At the time of the withdrawal, the Agency insisted that it did have statutory authority to promulgate the rule, that the rule was being withdrawn only

^{48/} Motion to Dismiss, supra.

^{49/} Id.

for procedural irregularities, and that the case had become moot as a result of the withdrawal of the rule. 605 F.2d at 677. This Court rejected the Agency's contention that the case had been rendered moot. The crucial factor, according to this Court's analysis, was that "the EPA has not altered its substantive stance." 605 F.2d at 679. As the Court stated:

"If this action by the EPA were alone sufficient to render a live dispute moot, the timing and venue of judicial review could be effectively controlled by the agency. We are reluctant, then, to dismiss a genuine and concrete controversy for what in this case amounts to a technical reason, brought about by the party seeking such a dismissal." 605 F.2d at 679 (footnote omitted).

Similarly in this case, the central issue of what constitutes lawful emergency relief discharges under 40 C.F.R. § 61.65(a) is a continuing controversy between Tenneco and EPA and should be resolved by this Court for the same reasons expressed in Dow. EPA should not be allowed to defeat this Court's jurisdiction by a mere technicality and procedural maneuver, simply because the Agency is unhappy with the forum that Tenneco has selected.^{50/}

^{50/} If anything, this case is more egregious than Dow because there is actual evidence that EPA was engaging in a bald attempt at forum shopping. See Memorandum from M.E. Kantz, Chemical Engineer of the Air Facilities Branch of EPA, to J.H. Menczel, Chief of the New Jersey/Puerto Rico Section of the Air Facilities Branch of EPA, dated February 28, 1979, p. 5, App. 117, which Memorandum reported on a Vinyl Chloride Implementation and Enforcement Workshop, where, prior to the issuance of the Orders, the Agency discussed the question of choosing a favorable forum for enforcing the Agency's "tough stand" on discharges: "EPA may try to bring actions in places where the violator does business (not just where the plant is located) in order to find more favorable judges, although this tactic could backfire." (App. 117.)

III. EPA DID NOT PROPERLY APPLY THE APPLICABLE REGULATION,
SECTION 61.65(a) OF THE STANDARD, WHEN IT MADE ITS
DETERMINATION TO ISSUE THE ADMINISTRATIVE ORDERS.

At the heart of the case is one of the most fundamental issues in administrative law. An administrative agency, after following Congressionally prescribed procedural safeguards for rulemaking, promulgated regulations, i.e., the Standard. The Enforcement Branch of the Agency, obviously unhappy with the final regulations, decided to revise them ex parte at the enforcement stage.^{51/} This approach violates the most fundamental notions of our jurisprudence and is inconsistent with the basic premises of notice-and-comment rulemaking. There can be no justification for condoning it, not even zeal in the enforcement of environmental laws. We respectfully submit that this is not an exaggeration of what occurred.

As explained in the Statement of the Case, the Agency took a rigorous position in its original proposal relating to relief valve discharges. Specifically, it required dischargers to take "all available" measures to prevent the discharge.^{52/} However, even in the preamble accompanying that rigorous position, the Agency specifically contemplated that each time there was a relief valve discharge there would be an

^{51/} Supra at 7-8.

^{52/} 40 Fed. Reg. 59,545 (1975), App. 134.

investigation by the Agency and a determination as to whether the discharge could have been avoided.^{53/}

Not surprisingly, this rigorous position was criticized by industry members during the comment period.^{54/} In response to these comments, the Agency explicitly retreated from its earlier position by eliminating the words "all available." The proposed regulation also contained nothing to indicate that a firm would not be liable in the event of an error by one of its operators. In response to comments that operator error should not give rise to a violation, the Agency stated that "whether an operator error would be considered preventable or not will have to be decided on an individual basis depending on the surrounding circumstances."^{55/}

Here was an example of the rulemaking process functioning at its best: An agency proposed unreasonably severe regulations; those to be regulated presented reasoned objections; and the agency responded to the objections by modifying somewhat its proposal.

This was the background against which the Enforcement Branch of the Agency entered the picture. The Enforcement Branch issued the so-called DSSE Memoranda (summarized in the

^{53/} Id. at 59,539, App. 128.

^{54/} See Standard Support Document, R. 46 at 2-49 - 2-50, App. 82-83.

^{55/} Id. at 2-47, App. 80.

Statement of the Case) which were even more rigorous than the proposed Standard.

Specifically, under the proposed Standard, if a discharger had taken "all available" measures and a discharge still occurred, it would be deemed to be an emergency discharge and there would be no liability. Not so for the enforcement people. Under their rules it had to be an unpreventable disaster (i.e., tornado, hurricane, earthquake, flood, riot, sabotage, etc.) before it would be deemed an emergency and liability could be avoided.^{56/}

Similarly, both the proposed and final Standards contemplated that there would be an EPA investigation and a case-by-case determination as to whether or not the relief valve discharge was an emergency discharge. Again, not so for the Enforcement Branch. They bluntly determined that:

"When a source reports a relief valve discharge [the Agency will] presume that the discharge was not due to an emergency, but was preventable and is therefore a violation of Section 61.65(a)." (April 24, 1979 DSSE Memorandum, R. 41, App. 68.)

This amounts to nothing more than the Enforcement Branch elevating itself to a "super EPA," rewriting the Standard and making a mockery out of the Congressionally mandated rulemaking procedures.

This brings us to the Administrative Orders themselves. They were issued by Region II of EPA, headquartered in New

^{56/} May 18, 1978 DSSE Memorandum, R. 47, App. 84.

York City. In considering whether or not to issue the Orders, Region II should have gone back to the Standard itself. Instead it relied upon the DSSE Memoranda.^{57/} This is evident from the fact that no case-by-case investigation was made of each discharge. It is also evident from the transmittal letters accompanying the Orders, which not only echoed the positions outlined in the Memoranda, but even employed some of the same language contained therein.^{58/} The letters from Region II stated:

"As a minimum, the source must demonstrate that the discharge could not have been prevented by implementing any of the following procedures:

- 1) employee training programs including instruction on emergency procedures;
- 2) proper inspection and maintenance programs (including replacement of relief valve seals on a sufficiently frequent basis in order to prevent their rupture);
- 3) proper design and operation of process and control equipment; and
- 4) installation and operation of all control equipment needed to comply with the vinyl chloride standard.

If a source has previously experienced one or more discharges, some or all of which were caused by the same factor, the source is expected to have taken corrective measures designed to prevent or contain future discharges."^{59/}

^{57/} R. 1 and 2, App. 4-6 and 10-11.

^{58/} Supra at 10-11.

^{59/} R. 1 and 2 at 1-2, App 1-2 and 7-8; emphasis added.

The underscored language was taken directly from the April 24, 1979 DSSE Memorandum.^{60/}

Region II, therefore, plainly relied upon the DSSE Memoranda as the basis for its Orders to Tenneco. Since the DSSE Memoranda are at variance with the Standard, as finally adopted after notice-and-comment rulemaking, the Orders under review were improper and invalid.

IV. THERE WAS NO ADEQUATE FACTUAL BASIS IN THE RECORD FOR EPA'S FINDINGS THAT TENNECO VIOLATED 40 C.F.R. § 61.65(a), AND, THEREFORE, THE EPA FINDINGS WERE ARBITRARY, CAPRICIOUS, AN ABUSE OF DISCRETION AND NOT OTHERWISE IN ACCORDANCE WITH THE LAW.

It is important to realize that all the Agency had before it when it entered its Administrative Orders were the conclusory reports of relief valve discharges submitted by Tenneco in conformance with the Standard. These reports are reproduced in the Appendix. Typical entries read, for example,

"The cause of the [high pressure condition resulting in the discharge] was traced to a false temperature transmission signal, resulting from partial failure of an instrument air pressure regulator, during the batch heat-up cycle." (February 16, 1977 Discharge Report, R. 21, App. 37.)

"An instrumentation malfunction caused the temperature in the vessel to exceed the control set point and thus causing a sudden increase in pressure . . . The rupture disc that protects the safety relief valve failed at a [level lower than] the designated pressure . . ." (April 12, 1978 Discharge Report, R. 20, App. 36.)

^{60/} R. 41 at 1-2, App. 68-69.

"The second stage relief valve on our No. 5 recovery compressor lifted as a result of ice blockages in the condenser discharge line . . . [due to] meteorological conditions." (January 15, 1979 Discharge Report, R. 15, App. 30.)

With respect to the reported discharges, the Agency never made a case-by-case investigation of the type contemplated by the preamble to the proposed or final regulations. It never even asked Tenneco to "show cause" why an order should be issued. The Agency simply issued the Orders in blanket fashion, and, in so doing, acted improperly.

A. The Agency Did Not Have an Adequate Factual Basis For Making the Determination Required by the Standard.

The Standard clearly provides that not all relief valve discharges violate the Standard, but only those which are not emergency relief discharges, i.e., those which could have "been avoided by taking measures to prevent the discharge." It is respectfully submitted that there is no way in which the Agency acting on the basis of Tenneco's reports could have found that all of these discharges could have been avoided. Nor can it be argued that the Tenneco reports are inadequate. Rather, what the Standard contemplated was a report by a discharger, an investigation by the Agency and a determination. Here, there was no investigation and there is no adequate factual record to support the finding.

B. Even Under the Approach Taken by Region II
Of EPA, the Orders Do Not Contain an Ade-
quate Factual Basis to Support the Findings.

Quite apart from what the Standard required, the Agency actually entered a specific finding that "the discharges occurred under non-emergency conditions."^{61/} There is simply no basis in the record for this finding. The Agency's Orders do not point to any particular set of circumstances or facts, described by Tenneco in its discharge reports, as a basis for its finding of violations of the Standard. The Orders merely list the dates of the discharges and the approximate vinyl chloride emissions and conclude that "Tenneco discharged [these] quantities of vinyl chloride through relief valves at the [Burlington and Flemington] facilit[ies] under non-emergency conditions" without giving any further explanation for its conclusions.^{62/} No reasons are given for rejecting the explanations cited by Tenneco in its reports that the discharges were unavoidable and under emergency conditions.

In fact, if one employs the test in the Standard or in the comments relating to operator error, it seems clear, from the information contained in the Tenneco reports, that the discharges were unavoidable and constituted emergency discharges. For example, Tenneco's February 16, 1977 discharge

^{61/} Orders, R. 1 and 2 at 1, App. 4 and 10.

^{62/} Id. at 1-2, App. 4-5 and 10-11.

report cites a high pressure condition which resulted in a safety relief valve discharge.^{63/} The cause of the high pressure condition was traced to a false temperature signal resulting from a partial failure of an instrument air pressure regulator.^{64/} In another report, dated January 15, 1979, Tenneco reported a relief valve discharge due to ice blockages in the condenser discharge line caused by meteorological conditions.^{65/} In either instance the discharge must clearly be viewed as unavoidable. Tenneco could not have taken any measures to prevent these discharges. Nevertheless, in addition to failing to provide any reasoning for its findings of violations of the Standard in these cases, the Agency in its Orders did not account for its implicit rejection of Tenneco's explanations for the discharges.

In addition, in one of the two cases where a discharge was due to an operator's error, i.e., failure to open a downstream valve, the routine pressure gauge inspection procedures in effect did not catch the error because a different operator closed the valve due to a downstream condenser malfunction.^{66/} In this instance the operator's error was not preventable

^{63/} R. 21, App. 37.

^{64/} Id.

^{65/} R. 25, App. 30.

^{66/} R. 13, App. 28.

because it was not the result of any "lack of training" or an operator's "negligence."^{67/} We are not asking the Court to make a factual determination on this issue, but simply to illustrate that it was imperative for the Agency to follow the approach in its own regulation, determining whether this operator's error was in fact preventable "on an individual basis depending on the surrounding circumstances" as required by the Standard.^{68/} Nevertheless, the Agency did not undertake any such investigation or inquiry and did not request any further information with respect to this incident. The Agency in its Order merely cited the particular discharge and concluded that it was not an "emergency," again without providing any reasoning for its conclusion and without accounting for its implicit rejection of Tenneco's explanation for the discharge.

At the very least this underscores the necessity for an investigation by the Agency on a case-by-case basis, as it was required to do so by the Standard.

V. CONCLUSION

For the foregoing reasons, we respectfully request that this Court enter an order: (1) declaring invalid the Administrative Orders issued by EPA to Tenneco; (2) prohibiting EPA from taking any enforcement action with respect to those

^{67/} Standard Support Document, R. 46 at 2-47, App. 80.

^{68/} Id.

relief valve discharges which were the subject of the Administrative Orders; (3) requiring EPA, with respect to any other relief valve discharges to make a case-by-case investigation before taking any enforcement action; and (4) prohibiting EPA from relying upon the DSSE Memoranda in taking enforcement action.

Respectfully submitted

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ADDENDUM

Section 112 of the Clean Air Act (42 U.S.C. § 7412)

§ 7412. National emission standards for hazardous air pollutants

Definitions

(a) For purposes of this section—

(1) The term "hazardous air pollutant" means an air pollutant to which no ambient air quality standard is applicable and which in the judgment of the Administrator causes, or contributes to, air pollution which may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness.

(2) The term "new source" means a stationary source the construction or modification of which is commenced after the Administrator proposes regulations under this section establishing an emission standard which will be applicable to such source.

(3) The term "stationary source", "modification", "owner or operator" and "existing source" shall have the same meaning as such terms have under section 7411(a) of this title.

List of hazardous air pollutants; emission standards; pollution control techniques

(b)(1)(A) The Administrator shall, within 90 days after December 31, 1970, publish (and shall from time to time thereafter revise) a list which includes each hazardous air pollutant for which he intends to establish an emission standard under this section.

(B) Within 180 days after the inclusion of any air pollutant in such list, the Administrator shall publish proposed regulations establishing emission standards for such pollutant together with a notice of a public hearing within thirty days. Not later than 180 days after such publication, the Administrator shall prescribe an emission standard for such pollutant, unless he finds, on the basis of information presented at such hearings, that such pollutant clearly is not a hazardous air pollutant. The Administrator shall establish any such standard at the level which in his judgment provides an ample margin of safety to protect the public health from such hazardous air pollutant.

(C) Any emission standard established pursuant to this section shall become effective upon promulgation.

(2) The Administrator shall, from time to time, issue information on pollution control techniques for air pollutants subject to the provisions of this section.

Prohibited acts; exemption

(c)(1) After the effective date of any emission standard under this section—

(A) no person may construct any new source or modify any existing source which, in the Administrator's judgment, will emit an air pollutant to which such standard applies unless the Admin-

istrator finds that such source if properly operated will not cause emissions in violation of such standard, and

(B) no air pollutant to which such standard applies may be emitted from any stationary source in violation of such standard, except that in the case of an existing source—

(i) such standard shall not apply until 90 days after its effective date, and

(ii) the Administrator may grant a waiver permitting such source a period of up to two years after the effective date of a standard to comply with the standard, if he finds that such period is necessary for the installation of controls and that steps will be taken during the period of the waiver to assure that the health of persons will be protected from imminent endangerment.

(2) The President may exempt any stationary source from compliance with paragraph (1) for a period of not more than two years if he finds that the technology to implement such standards is not available and the operation of such source is required for reasons of national security. An exemption under this paragraph may be extended for one or more additional periods, each period not to exceed two years. The President shall make a report to Congress with respect to each exemption (or extension thereof) made under this paragraph.

State implementation and enforcement

(d)(1) Each State may develop and submit to the Administrator a procedure for implementing and enforcing emission standards for hazardous air pollutants for stationary sources located in such State. If the Administrator finds the State procedure is adequate, he shall delegate to such State any authority he has under this chapter to implement and enforce such standards.

(2) Nothing in this subsection shall prohibit the Administrator from enforcing any applicable emission standard under this section.

Design, equipment, work practice, and operational standards

(e)(1) For purposes of this section, if in the judgment of the Administrator, it is not feasible to prescribe or enforce an emission standard for control of a hazardous air pollutant or pollutants, he may instead promulgate a design, equipment, work practice, or operational standard, or combination thereof, which in his judgment is adequate to protect the public health from such pollutant or pollutants with an ample margin of safety. In the event the Administrator promulgates a design or equipment standard under this subsection, he shall include as part of such standard such requirements as will assure the proper operation and maintenance of any such element of design or equipment.

(2) For the purpose of this subsection, the phrase "not feasible to prescribe or enforce an emission standard" means any situation in which the Administrator determines that (A) a hazardous pollutant or pollutants cannot be emitted through a conveyance designed and constructed to emit or capture such pollutant, or that any requirement for, or use of, such a conveyance would be inconsistent with any Federal, State, or local law, or (B) the application of measurement methodology to a particular class of sources is not practicable due to technological or economic limitations.

(3) If after notice and opportunity for public hearing, any person establishes to the satisfaction of the Administrator that an alternative means of emission limitation will achieve a reduction in emissions of any air pollutant at least equivalent to the reduction in emissions of such air pollutant achieved under the requirements of paragraph (1), the Administrator shall permit the use of such alternative by the source for purposes of compliance with this section with respect to such pollutant.

(4) Any standard promulgated under paragraph (1) shall be promulgated in terms of an emission standard whenever it becomes feasible to promulgate and enforce such standard in such terms.

(5) Any design, equipment, work practice, or operational standard, or any combination thereof, described in this subsection shall be treated as an emission standard for purposes of the provisions of this chapter (other than the provisions of this subsection).

Section 307(b)(1) of the Clean Air Act
42 U.S.C. § 7607(b)(1)

Judicial review

(b)(1) A petition for review of action of the Administrator in promulgating any national primary or secondary ambient air quality standard, any emission standard or requirement under section 7412 of this title, any standard of performance or requirement under section 7411 of this title, any standard under section 7521 of this title (other than a standard required to be prescribed under section 7521(b)(1) of this title) any determination under section 7521(b)(5) of this title, any control or prohibition under section 7545 of this title, any standard under section 7571 of this title, any rule issued under section 7413, 7419, or 7420 of this title, or any other nationally applicable regulations promulgated, or final action taken, by the Administrator under this chapter may be filed only in the United States Court of Appeals for the District of Columbia. A petition for review of the Administrator's action in approving or promulgating any implementation plan under section 7410 of this title or section 7411(d) of this title, any order under section 7411(j) of this title, under section 7412(c) of this title, under section 7413(d) of this title, under section 7419 of this title, or under section 7420 of this title, or his action under section 119(c)(2)(A), (B), or (C) (as in effect before August 7, 1977) or under regulations thereunder, or any other final action of the Administrator under this chapter (including any denial or disapproval by the Administrator under subchapter I of this chapter) which is locally or regionally applicable may be filed only in the United States Court of Appeals for the appropriate circuit. Notwithstanding the preceding sentence a petition for review of any action referred to in such sentence may be filed only in the United States Court of Appeals for the District of Columbia if such action is based on a determination of nationwide scope or effect and if in taking such action the Administrator finds and publishes that such action is based on such a determination. Any petition for review under this subsection shall be filed within sixty days from the date notice of such promulgation, approval, or action appears in the Federal Register, except that if such petition is based solely on grounds arising after such sixtieth day, then any petition for review under this subsection shall be filed within sixty days after such grounds arise.

40 C.F.R. § 61.65(a)

§ 61.65 Emission standard for ethylene dichloride, vinyl chloride and polyvinyl chloride plants.

An owner or operator of an ethylene dichloride, vinyl chloride, and/or polyvinyl chloride plant shall comply with the requirements of this section.

(a) *Relief valve discharge.* Except for an emergency relief discharge, there is to be no discharge to the atmosphere from any relief valve on any equipment in vinyl chloride service. An emergency relief discharge means a discharge which could not have been avoided by taking measures to prevent the discharge. Within 10 days of any relief valve discharge, the owner or operator of the source from which the relief valve discharge occurs shall submit to the Administrator a report in writing containing information on the source, nature and cause of the discharge, the date and time of the discharge, the approximate total vinyl chloride loss during the discharge, the method used for determining the vinyl chloride loss, the action that was taken to prevent the discharge, and measures adopted to prevent future discharges.

RELIEF VALVES...

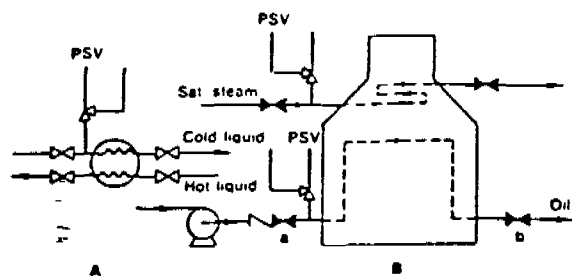


Fig. 2—(A) Heat exchanger protected on cold side. (B) Fired tube heater protected by relief valves on tube side.

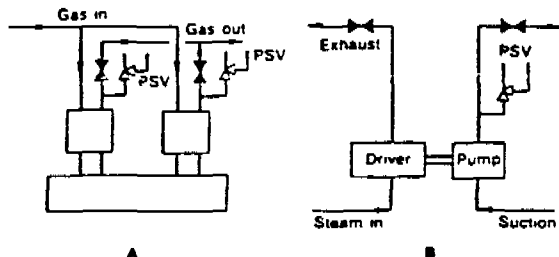


Fig. 3—(A) Reciprocating compressor protected on the discharge side. (B) Reciprocating pump or gear pump protected on the discharge side.

preventing any reverse flow; or by having the outlet block valve closed with the pump pumping liquid through the relief valve. Because of the latter condition, it is preferred that the relief valve be placed on the coil inlet side. This also protects the coils in the event of coking.

In Fig. 2-B, it is very possible to start up the heater with the valves on the steam coils closed with liquid condensed in the coils. Because of this possibility, it is necessary to insert a relief valve on the super-heater steam coil. A city inspector in a large city once refused to permit a plant from starting up until a relief valve was inserted for just such an application.

Block outlets can apply to:

- A. Reciprocating compressors
- B. Reciprocating pumps
- C. Gear pumps
- D. Steam exhaust side of turbines
- E. Fractionating columns.

In the first three, we have constant displacement equipment. The units are discharging constant volume liquid, gas or vapor. If the discharge is blocked, the units are designed so that fluid cannot reverse but must go forward with the motion of the piston or gear. If it cannot go forward, then the unit will either stall or rupture the case or associated piping. Fig. 3 illustrates typical relief valve arrangements. In A and B, relief valves may discharge to the suction side of the units.

Fig. 4 refers to a turbine driven pump with a relief valve on the steam exhaust side of the turbine. The reason for this arrangement is that the exhaust side of a

turbine is invariably designed for a much lower pressure than the inlet side. If the inlet side of the turbine were to be open and the outlet side blocked, then the exhaust pressure would be the same as the inlet.

Overpressure can also be developed in fractionating columns (Fig. 5) when the overhead vapors are blocked and the source of heat to the column continues. This condition can produce overpressure and necessitates the use of a relief valve on the column.

Loss of reflux can also cause overpressure to the column since it acts as a coolant. Reflux failure may be due to pump failure, instrument failure or loss of cooling water.

Instrument failure. Another possibility to guard against is instrument failure. Instrument failure can be attributed to the instrument itself failing, or loss of instrument air or power to one or all the instruments.

Instrument failure usually causes control valve "freezing" in an open or closed position. Suppose, in Fig. 6, that the stripping to the column is at 10 kg/cm², the maximum design of the column is 3.5 kg/cm², and the control valve, FRCV, freezes in an open position. If the overhead condenser is not designed to condense the full capacity of steam through the control valve, or if the block valve between the condenser and accumulator is closed, then it is possible to overpressure the column with 10 kg/cm² steam.

Entrance of a fluid or vapor from a high pressure system to a low pressure system may sometimes be a source of equipment overpressure. In Fig. 6-B, absorption of wet gas with lean oil takes place at 30 kg/cm². Rich oil leaves the absorber through a level-control valve to the deethanizing column, which operates at 13.5 kg/cm² and has a maximum design pressure of 17 kg/cm². The only thing that separates the absorber from the deethanizer is the control valve which reduces the pressure (and controls the level) down to the operating pressure in the deethanizer. If the control valve were to freeze in an open position, it is possible to feed an excess of high pressure liquid and gas to the deethanizer. If the deethanizer is not designed to handle this high rate, then relief protection must be provided.

Other possibilities to consider as the basis of instrument failure are:

- Steam or hot oil control to a reboiler
- Cooling water control on a condenser or cooler
- Steam control to a turbine
- Pressure control on a fractionating column
- Steam boiler controls.

Abnormal process operation. Abnormal process operation also has to be considered in the application of relief valves. The human element is just as fallible as equipment elements.

As an example, in Fig. 2-A, manually shutting off the block valves on the cold side of the exchanger and opening the block valves on the hot side. In Fig. 2-B, manually shutting off the block valves on the steam coil containing water, and keeping the heater fired. Manually shutting off discharge valves on the compressor and pump in Fig. 2-A and 5. These examples are just a few in which it is

P.B. Frankland, "Relief Valves . . . What Needs Protection?",
Hydrocarbon Processing, pp. 189-91 (Apr. 1978)

Relief valves . . . What needs protection?

If relief valves are not located to be most effective, the results can be disastrous

P. B. Frankland, Davy Powergas Ltd., London

A "Must" in all chemical processing plants and refineries is proper use and selection of relief valves. By means of relief valves, equipment is protected from rupture; fire hazards are reduced; safety to personnel is increased, and continuous plant operation is assured.

The importance of relief valves to the public welfare has grown to such an extent that all cities, counties, states and the federal government have specific relief valve codes that are strenuously enforced and regulated. Plants are often forbidden to start up because of not adhering satisfactorily to a relief valve code governing that particular locality.

Relief valves in general are discussed in the API Recommended Practice RP 520 and the ASME "Unfired Pressure Vessel Code." Mentioned as causes for over-pressure are fires; or other unexpected sources of heat. However, to properly diagnose a need for a relief valve, engineers should consider over-pressure due not only to the above causes, but also to:

Process variations

- Abnormal process operation
- Equipment failure.

Fire considerations. Fire is number one in the minds of safety engineers in petroleum refineries and chemical plants because it is more prevalent and devastating.

If equipment containing liquid is exposed to fire, it is possible for the heat to vaporize the liquid. Pressure developed in the vessel will be a function of temperature and composition of the liquid-vapor state. To keep pressure down an escape for the vapors generated must be provided otherwise, it is possible to develop excessive pressure and rupture the equipment. Types of equipment to consider that may be exposed to fire are heat exchangers, fractionating columns, storage vessels and operating vessels.

In general, when applying relief valves, equipment that

is connected by a system of adequate piping not containing valves which can isolate any item may be considered as one unit. If items can be separated from one another by valves in connecting piping, then each item must be considered as a unit with its own individual relief valve or valves.

As an example, in Fig. 1-A, the items are not separated by valves; therefore, PSV-1 can be used to protect V-1, V-2, and E-1. In Fig. 1-B, V-1 and E-1 are separated from V-2 by a valve; therefore, PSV-1 can be sized to relieve V-1 and E-1, and PSV-2 sized to relieve V-2.

Blocked outlets and inlets. Liquid filled lines that can be blocked in and are exposed to the sun should be protected by relief valves. The sun beating down on bare pipe can heat entrapped liquid, and create enough pressure to easily rupture piping. Relief valves should also be fitted to lines containing LPG and all traced lines.

If the cold side of a heat exchanger is liquid filled and can be blocked, it should have a relief valve. Referring to Fig. 2-A, it is quite possible to close the block valves on the cold side of the heat exchanger and at the same time have hot liquid go through on the "hot" side. In this situation, the "hot" side can transmit heat to the "cold" side, expand the block-in liquid and easily rupture the shell.

A fired-tube heater with liquid oil in the coils, if the coils can be blocked in, requires relief protection. In Fig. 2-B, the heater can very easily have the coils blocked in and heat applied at the same time. The coils can be blocked in by closing the two block valves "a" and "b"; or by closing the outlet block valve and the check valve

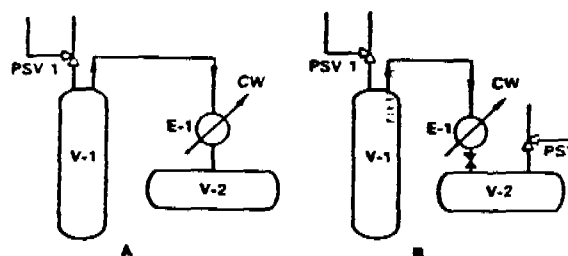


Fig. 1—(A) Interconnected equipment which cannot be isolated. (B) Interconnected equipment which can be isolated by a block valve.

possible that manual operation can cause overpressure of equipment, and in all cases must be considered for sizing relief valves.

Equipment failure. Plant cooling water pump failure, fractionating column reflux pump failure and tube rupture of heat exchangers are the most important of process equipment failures causing overpressure.

The pumps may fail due to loss of power or mechanical breakdown. Exchanger tubes are subject to splitting and consideration should be given to the source of high pressure and its effect on the low pressure side. If, for example, a tube splits and the high pressure is on the tube side, then it is possible to overpressure the shell side, shell piping or associated equipment. The same consideration should be given if the high pressure were on the shell side.

Water hammer. Rapid shut-off of a valve in a liquid line or shut-off of a pump may induce water hammer in piping. Water hammer fundamentally is pressure waves transmitting back and forth in a liquid filled pipe.

Sometimes this pressure may rupture piping or equipment. To protect piping and equipment from water hammer, a relief valve should be used. Refer to API 521 paragraph 2.3 for solution to fast response systems.

Vacuum relief. Equipment (if not designed for vacuum service) has to be protected against underpressurizing as well as overpressurizing. If atmospheric pressure on the outside of the vessel is greater than the pressure on the inside, it is possible to collapse the walls.

Full or partial vacuum in equipment may be caused by any one of the following:

- Pumping more liquid out of a vessel than is entering
- Draining liquid from a vessel (water, such as after a hydrostatic test, which is most common) without venting
- Injecting cold liquid into a vessel after steaming it out or continuing reflux after reboiler steam failure.

The first two are quite obvious. Withdrawing liquid without replacing the displaced volume will produce a vacuum. In the third, if the vessel is full of steam and cold liquid is injected into the unit, then the liquid will condense the steam, considerably reducing the volume occupied by the steam and produce a vacuum.

Pilot operated relief valves. A pilot operated relief valve is not operated directly from line pressure, as with the conventional type, but via a pilot valve which introduces a snap action to the main relieving valve. With conventional valves an overpressure of 10 percent is required, but a P.L.O.R.V. can be set up to 2 percent, this has obvious advantages when high pressures are involved.

Other advantages include adjustable blowdown (typically 2 percent) which means a saving of product, large valve capacity and repetitive operation. The disadvantages are long delivery and price (50-100 percent higher) and they must be used with clean fluids or the pilot valve may become blocked.

Isolation valves. Isolation valves should be provided when a rupture disc is used in combination with a safety/relief valve if local regulations permit.

Stop valves in conjunction with safety/relief

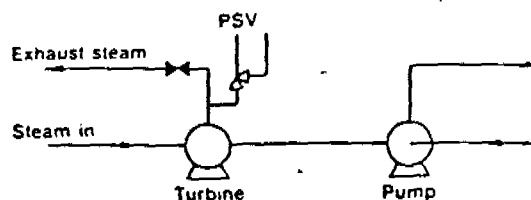


Fig. 4—Turbine driver protected on the exhaust side.

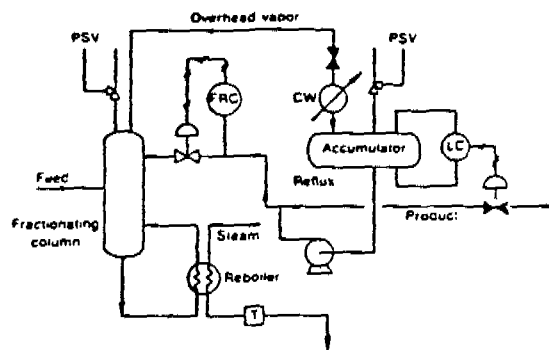


Fig. 5—Typical fractionating unit.

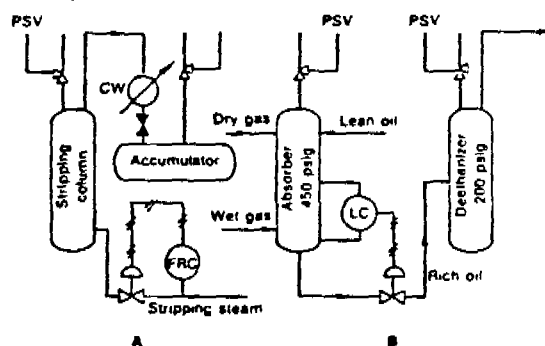


Fig. 6—(A) Stripping steam to column. (B) Absorption unit.

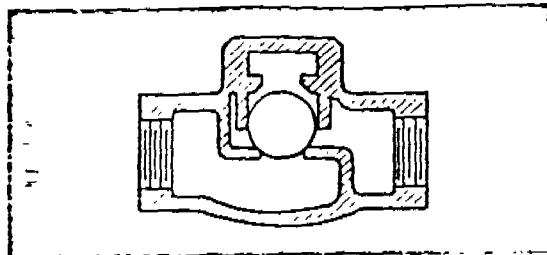
only applied if replacing a safety/relief is deemed necessary and is expected to cause unacceptable production loss, operational upset or air pollution in which case a second (spare) relief valve should be installed and a suitable interlock of block valves provided to ensure that the plant is fully protected at all times.

References: API RP 520 Part I, API RP 520 Part II, API RP 521, ASME "Unfired Pressure Vessel Code", DPG Standard 5540 STD/S1.

The typical examples cited will take care of approximately 95 percent of all safety/relief requirements in refineries, chemical plants and power plants.

In all probability the safety equipment may never be used—which is good; but, should it be used only once, then it more than pays for itself in rate of return on the

VALVE SELECTION . . .



BALL CHECK valves generally give trouble-free service—Fig. 11

preferred for viscous and coking services where their operation is more trouble free than that of other types.

Excess-flow check valves are in-line devices that act automatically to prevent high forward flow rates. They are spring actuated to hold the valve disc open. On high flows that might occur with pipe rupture, the fluid force is sufficient to overcome the spring and the valve closes. A bleed port in the valve disc allows upstream and downstream pressures to equalize so that the valve can reopen.

This check valve is applied on high pressure liquid storage tanks to prevent accidental spills. Where a rupture disc is installed below a pressure relief valve, the excess flow check is used to maintain atmospheric pressure between the rupture disc and relief valve.

Various flow through check valves are also available in small sizes. Generally, these are applicable to clean services with pressures to 10,000 psi. and operating temperatures to 300 F. These valves use spring loading of the check that allows installation in any attitude. Their metal-to-metal seat is backed by a resilient seal to provide bubble tight shutoff.

Pressure Relief Valves

Pressure relief is required whenever the design pressure of a system may exceed what the system is capable of handling. The pressure relief valve, because of its simplicity and self-actuation, is probably the most reliable device providing shutoff after an over-pressure condition. The design pressure of the equipment the pressure relief valve is intended to protect will determine its set pressure. For further details on set pressure determination, the reader should refer to the appropriate ASME code.

In order to avoid ambiguity, several definitions are necessary:

- **Relief Valve:** An automatic pressure relieving device actuated by static pressure on the upstream side. The valve opens in proportion to the increase over opening pressure and is used mainly on liquid service.
- **Safety Valve:** An automatic pressure relieving device actuated by static pressure on the upstream side. The valve opens very quickly (pop action) and is used mainly on steam and vapor service.
- **Safety Relief Valve:** An automatic pressure relieving device that can be used as a relief or safety valve.
- **Pressure Relief Valve:** A generic term encompassing relief, safety, and safety relief valves.

► **Conventional Safety Relief Valve:** A safety relief valve with the bonnet vented either to atmosphere or the downstream side. Valve set pressure, reseating pressure and capacity are influenced by the back pressure.

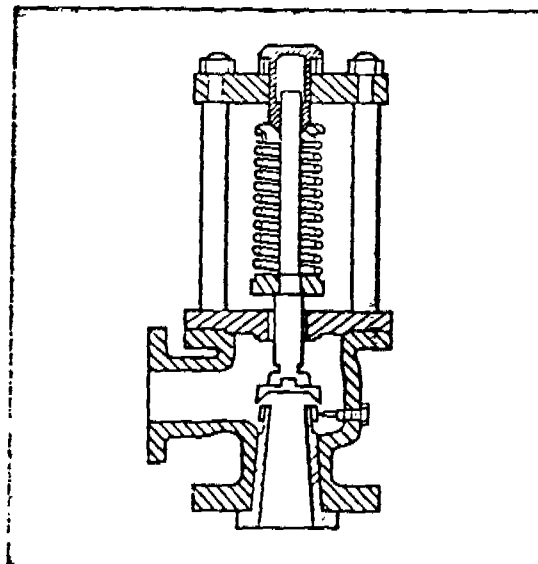
► **Balanced Safety Relief Valve:** A safety relief valve with the bonnet vented to atmosphere. The effects of back pressure on valve performance are minimized.

► **Blowdown:** Difference between set and reseating pressures of a pressure relief valve expressed as a percent of set pressure or in psi.

The function of the safety relief valve is to sense a pressure build up in the system and to provide a flow path for material out of the system. Pressure build up is sensed by a force-balance arrangement that consists of process pressure acting on a fixed area and opposed by a spring or weight. Weight actuated valves are no longer used in process plants, except where very low pressures settings are required.

The direct, spring-opposed pressure relief valve usually has an angle body. The inlet connection is suitable for the upstream temperature and pressure, while the outlet side and bonnet are designed for lower pressures. The outlet side is normally larger than the inlet to allow for expansion of the flowing medium. The inlet port contains the valve disc and the seat, which may be a bushing, semi-nozzle, or the full-nozzle shown in Fig. 12.

The disc is most commonly directly spring loaded with the force transmitted to the disc through the stem. Process valves are usually top guided, while disc (bottom) guiding is common on boiler and liquid relief valves. The bushing is utilized on bottom guided valves and the semi-nozzle on cast iron valves. These seats are screwed into the body. Full-nozzles, which are used on steel valves, incorporate seat, orifice and



SAFETY RELIEF valve with conventional full nozzle—Fig. 12

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