Management of Hazards Associated with Location of Process Plant Buildings

API RECOMMENDED PRACTICE 752
SECOND EDITION, NOVEMBER 2003

American Petroleum Institute

Helping You Get The Job Done Right.SM

Management of Hazards Associated with Location of Process Plant Buildings

Downstream Segment

API RECOMMENDED PRACTICE 752
SECOND EDITION, NOVEMBER 2003

American Petroleum Institute

Helping You Get The Job Done Right.SM

SPECIAL NOTES

API publications necessarily address problems of a general nature. With respect to particular circumstances, local, state, and federal laws and regulations should be reviewed.

API is not undertaking to meet the duties of employers, manufacturers, or suppliers to warn and properly train and equip their employees, and others exposed, concerning health and safety risks and precautions, nor undertaking their obligations under local, state, or federal laws.

Information concerning safety and health risks and proper precautions with respect to particular materials and conditions should be obtained from the employer, the manufacturer or supplier of that material, or the material safety data sheet.

Nothing contained in any API publication is to be construed as granting any right, by implication or otherwise, for the manufacture, sale, or use of any method, apparatus, or product covered by letters patent. Neither should anything contained in the publication be construed as insuring anyone against liability for infringement of letters patent.

Generally, API standards are reviewed and revised, reaffirmed, or withdrawn at least every five years. Sometimes a one-time extension of up to two years will be added to this review cycle. This publication will no longer be in effect five years after its publication date as an operative API standard or, where an extension has been granted, upon republication. Status of the publication can be ascertained from the API Standards department telephone (202) 682-8000. A catalog of API publications, programs and services is published annually and updated biannually by API, and available through Global Engineering Documents, 15 Inverness Way East, M/S C303B, Englewood, CO 80112-5776.

This document was produced under API standardization procedures that ensure appropriate notification and participation in the developmental process and is designated as an API standard. Questions concerning the interpretation of the content of this standard or comments and questions concerning the procedures under which this standard was developed should be directed in writing to the Director of the Standards department, American Petroleum Institute, 1220 L Street, N.W., Washington, D.C. 20005. Requests for permission to reproduce or translate all or any part of the material published herein should be addressed to the Director, Business Services.

API standards are published to facilitate the broad availability of proven, sound engineering and operating practices. These standards are not intended to obviate the need for applying sound engineering judgment regarding when and where these standards should be utilized. The formulation and publication of API standards is not intended in any way to inhibit anyone from using any other practice.

Any manufacturer marking equipment or materials in conformance with the marking requirements of an API standard is solely responsible for complying with all the applicable requirements of that standard. API does not represent, warrant, or guarantee that such products do in fact conform to the applicable API standard.

FOREWORD

This publication is intended to assist management in identifying issues related to location of process plant buildings which might be of potential concern, understanding associated hazards, and managing risk. Among hazards that potentially could affect occupants of process plant buildings are: fire, explosion, and toxic releases. This publication provides a methodology for assessing and evaluating the hazards associated with location of process plant buildings. It is not an engineering guide for the design of blast-resistant buildings.

Serious accidental releases of toxic material or explosions that impact occupied process plant buildings are not frequent events. Preventing incidents in process plants is a better safety investment than providing mitigation systems or redesigning process plant buildings. The implementation of process safety management, as described in API's historical Recommended Practice 750, publications of the AIChE CCPS and OSHA 1910.119 is intended to improve industry's safety performance. Risk management involves cost-effective applications of risk-reduction alternatives.

Because this publication affects many existing buildings within processing facilities, a substantial effort may be required for full implementation of the recommended practice. This could include identifying buildings of concern, conducting building evaluations and, if appropriate, performing building upgrades or modifications. It is recognized that a substantial period of time may be required for complete application of the recommended practice, due to the scope and magnitude of the endeavor.

This second edition of API RP 752 *Management of Hazards Associated with Location of Process Plant Buildings* recognizes that available information, publications and relevant references concerning specific PSM activities constitute a growing body of knowledge. A number of resource publications are specifically referenced in the body of this standard while others are listed in Appendix A.

API publications may be used by anyone desiring to do so. Every effort has been made by the Institute to assure the accuracy and reliability of the data contained in them; however, the Institute makes no representation, warranty, or guarantee in connection with this publication and hereby expressly disclaims any liability or responsibility for loss or damage resulting from its use or for the violation of any federal, state, or municipal regulation with which this publication may conflict.

Suggested revisions are invited and should be submitted to the standardization manager, American Petroleum Institute, 1220 L Street, N.W., Washington, D.C. 20005.

CONTENTS

Tables

Management of Hazards Associated with Location of Process Plant Buildings

SECTION 1—GENERAL

1.1 PURPOSE

This publication provides guidance for identifying hazards that may affect process plant buildings and for managing risks related to those hazards. An analysis process set forth in this Recommended Practice provides a structured approach that can improve worker safety by the following:

a. Continuing to improve the understanding of identified hazards.
b. Continuing to focus on accident prevention and addressing identified hazards.
c. Managing risk.

The methodology recommended in this document will help provide the user with an understanding of the relative risk of each building studied. This relative risk should be considered in long-range planning and projects that involve building changes (such as control building consolidation, office building replacements, and so forth).

1.2 SCOPE

1.2.1 Applicability

This publication was developed for refineries, petrochemical and chemical operations, natural gas liquids extraction plants, and other facilities covered by the OSHA Process Management Standard, 29 *CFR* 1910.119. This publication does not apply to production facilities surrounded by navigable waters, such as offshore platforms or to storage tanks, wastewater tanks and similar facilities. Such facilities have unique siting issues which are addressed by other recommended practices, such as RP 14J for off-shore facilities.

Additionally, this publication is not intended for use in designing and locating safe refuge from the effects of fires, explosions, and toxic releases.

1.2.2 Relationship of this Recommended Practice to OSHA 29 *CFR* 1910.119

OSHA 29 *Code of Federal Regulations* (*CFR*) 1910.119, "Process Safety Management of Highly Hazardous Chemicals (PSM)," includes requirements for addressing facility siting as part of a process hazards analysis (PHA).

This publication is intended to assist in identifying the siting issues for process plant buildings, understanding the associated hazards, and managing the risk. Hence, this publication provides a framework that can be used to address facility siting within the PHA requirements of OSHA 29 *CFR* 1910.119 as applied to buildings.

The PHA as required by OSHA 29 *CFR* 1910.119 is intended to identify scenarios that could lead to serious releases of toxic or flammable materials or an explosion. Those parts of this publication intended to assist in the PHA process are identified on the flowcharts (see Figures 2, 4, and 5) by a dashed-line box labeled "PHA." The remaining parts are intended to serve as management aids in resolving issues that arise when evaluating the location of process plant buildings.

1.3 DEFINITIONS

For the purpose of this publication, the following definitions apply:

1.3.1 aggregate risk: A measure of the total risk to all personnel within a building(s) or within a facility, depending upon the risk being evaluated, who are impacted by a common event, taking into account the total time spent in the building(s) or facility.

1.3.2 assessment: Describes a detailed qualitative or quantitative analysis to estimate the potential likelihood and consequences of site-specific events, and then to compare the results with acceptance criteria.

1.3.3 confinement: A qualitative or quantitative measure of the enclosure or partial enclosure areas where a vapor cloud may be contained.

1.3.4 congestion: A qualitative or quantitative measure of the physical layout, spacing, and obstructions within a facility that promote development of a vapor cloud explosion.

1.3.5 evaluation-case event: The scenario with the most severe consequences, considering all incidents and their outcome, that is considered plausible or reasonably believable.

1.3.6 evaluation: Describes the application of analytical tools to aid in making decisions about buildings.

1.3.7 hazard: An inherent physical or chemical characteristic (flammability, toxicity, corrosivity, stored chemical or mechanical energy) or set of conditions that has the potential for causing harm to people, property, or the environment.

1.3.8 individual risk: The risk to a single person inside a particular building. Maximum individual risk is the risk to the most-exposed person and assumes that the person is exposed.

1.3.9 process plant building (also referred to in this recommended practice as a *building*): Any temporary or permanent building within a facility that could be