Dismantling and Disposing of Steel From Aboveground Leaded Gasoline Storage Tanks

API PUBLICATION 2202
THIRD EDITION, JANUARY 1991

American Petroleum Institute
1220 L Street, Northwest
Washington, D.C. 20005

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Safety and Fire Protection Department

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SECTION 1—GENERAL

1.1 Scope

This publication outlines precautions to prevent hazardous exposure of personnel to lead antiknock compounds while dismantling and disposing of the steel from aboveground petroleum storage tanks that previously contained leaded gasoline and have been declared free from any lead hazard. It is confined to this subject and does not include precautions for other hazards such as other toxic materials that may be present and ignitions associated with working on or in tanks. Even when a tank has been declared free from any lead hazard, there remains the potential for volatilizing lead residue during cutting operations. Therefore, appropriate precautions should be taken to protect personnel from exposure to these hazards. For additional information concerning the conditions under which a tank is considered free from any lead hazard, see API Publication 2015.

Small (that is, 1000-barrel) capacity aboveground storage tanks are not covered by this standard because these tanks are not normally used as leaded-gasoline blending tanks. Consequently, the lead hazard is not as great.

Disposal of these smaller tanks should be treated in the same manner as disposal of underground storage tanks (see API Recommended Practice 1604).

1.2 Introduction

The dismantling of aboveground tanks that have been used to store leaded gasoline and the disposing of steel or other material removed from those tanks present a potential exposure of workers to lead antiknock compounds. This potential exposure results from the presence of lead vapors, fumes, and dusts from such compounds, which may be inhaled.

Local conditions usually dictate the mechanical method of tank dismantling. Flame-cutting or air-driven cold-cutting tools are often used. Tanks may be cut from the inside or the outside. However, if the economics and mechanics of the situation permit, it is preferable to work from the outside of a tank to ensure clean breathing air for personnel. Respiratory protection is required under certain conditions. Special clothing to minimize exposure of the skin to lead antiknock compounds may also be required.

For unlined tanks, the greatest amount of organic and inorganic lead contamination occurs on the bottom shell ring and the bottom plates as a result of their constant, prolonged contact with sludge.

The application of heat (for example, from a cutting torch) to lined tanks may volatilize lead compounds absorbed in or trapped behind the lining. In addition, heat-induced decomposition products of the lining may have toxic properties. Therefore, precautions against breathing such vapors or fumes are of the utmost importance.

Tanks that have been damaged or destroyed by fire may present extraordinary cleaning and dismantling problems. However, the disposal procedures outlined in this publication are also applicable to the steel removed from such tanks.

1.3 Lead Antiknock Compounds

Toxic effects can result from exposure to tetraethyl lead and tetramethyl lead via contact with the skin and eyes, breathing of vapors or dust, or swallowing. Refer to OSHA[1] 29 *Code of Federal Regulations,* 1910:1025 for regulations concerning lead hazard. Antiknock compounds that contain lead alkyls can exhibit local irritant properties that may be manifested by stinging of the eyes. Acute exposure to tetraethyl lead and tetramethyl lead above permissible exposure limits may have adverse systemic effects including effects on the liver, the gastrointestinal tract, and the central nervous system. Indications of systemic effect are varied and may include insomnia, restlessness, anxiety, mental disturbance, loss of appetite, and nausea. There also may be long-term (chronic) health effects of varying severity.

Additional chemical information can be obtained from the lead antiknock supplier's Material Safety Data Sheet (MSDS) in accordance with the OSHA "Hazard Communication Standard" (29 *Code of Federal Regulations*, 1910:1200).

1.4 Medical Surveillance Program for Monitoring Lead Exposure

A medical surveillance program for monitoring potential exposure to lead is not mandatory, but it is advisable. Such a program should typically include the following elements:

a. A work history questionnaire.
b. A physical examination with emphasis on the central nervous system.
c. An initial urine sample that is analyzed for lead content. Samples should be taken on a regular basis during the work period, usually on the last work day of the week. A final sample should be taken at the end of employment or work.

[1]Occupational Safety and Health Administration, U.S. Department of Labor. The *Code of Federal Regulations* is available from the U.S. Government Printing Office, Washington, D.C. 20402.

1.5 Referenced Publications

The following publications and codes are cited in this publication:

API

RP 1604 *Removal and Disposal of Used Underground Petroleum Storage Tanks*

Publ 2015 *Safe Entry and Cleaning of Petroleum Storage Tanks*

Publ 2207 *Preparing Tank Bottoms for Hot Work*

OSHA

29 *Code of Federal Regulations*, 1910:1025 and following

29 *Code of Federal Regulations*, 1910:1200 and following

SECTION 2—DISMANTLING PRECAUTIONS

2.1 General

2.1.1 The first step before dismantling work begins is to clean the tank (and pontoons on floating roofs, if present) in accordance with API Publication 2015.

2.1.2 A tank that has been used for mixing or storing leaded gasoline is a potential source of organic-lead poisoning. Lead antiknock compounds are highly toxic and can be absorbed in toxic amounts by inhalation, ingestion, and absorption through the skin. It is therefore imperative that the proper precautions to protect personnel are strictly adhered to. (For further information concerning the hazards of lead antiknock compounds, refer to API Publication 2015.)

For example, the hands and face should be washed before eating or smoking, food materials should not be placed in the immediate area of the work site, workers should be required to wear garments with long sleeves, and workers should change clothes and bathe with soap at the end of each working day. Clean work clothes should be worn at the beginning of each shift. Guidance on a medical surveillance program for monitoring potential lead exposure is given in 1.4. Although such a program is not mandatory, it is advisable.

Badly soiled work clothes should be laundered separately using standard laundering methods. As an alternative, disposable work clothing can be used. If badly soiled work clothes are taken to a commercial laundry, the laundry should be informed that the clothing is potentially lead contaminated and instructed to wash it separately from other clothing.

2.1.3 The dismantling of a tank will dislodge accumulated scale and rust, resulting in substantial amounts of dust. This is especially true during cold-cutting or abrasive-blasting operations and is the principal reason why dismantling from the outside is more desirable. An application of water spray or fog can reduce the dust. If excessive dust is present in the tank dismantling area, personnel should wear respirators or supplied-air respiratory devices that are approved by MSHA[2] or NIOSH[3] and are appropriate for the potential hazard that may exist, even when working on the outside of the tank. Disposal of contaminated water, paint, scale, and other material must conform with local, state, and federal regulations.

2.2 Cold Cutting

2.2.1 If workers are inside the tank during dismantling, excessive scale or rust should be removed with a chipping hammer before the cutting tool is employed. Appropriate eye and face protection should be worn.

2.2.2 All persons inside the tank must wear NIOSH- or MSHA-approved respirators for protection from toxic dust during chipping and cold-cutting operations. Spheres, spheroids, and other tanks with internal shelflike stiffener rings present additional difficulties. These rings tend to accumulate deposits of sludge and scale. Because of the location of the rings, it is difficult to clean them thoroughly during normal tank cleaning operations. If large deposits of sludge and scale are encountered during the dismantling operation, the dismantling should be stopped until a fully protected crew removes such deposits. All residue should be removed and disposed of in an approved manner, as described in API Publication 2015.

2.3 Flame Cutting

2.3.1 During flame-cutting operations inside the tank, each worker exposed to fumes should wear positive-pressure air-supplied respiratory protective equipment, unless a strip at least 30 centimeters (12 inches) wide on each side of the cutting line has been previously cleaned to bare metal.

2.3.2 Workers may flame cut from outside the tank without respiratory protection, if the area has been cleaned as described in 2.3.1. If the exterior of the tank has been primed or painted with lead-base paint or the surface has not been cleaned, a respirator approved by NIOSH or MSHA for protection from toxic metal fumes should be worn.

2.3.3 If it is suspected that the tank bottom has leaked into the tank substrate, it may be necessary to raise, roll up, or move the bottom to ensure positive gas freeing before it is flame cut, as described in API Publication 2207.

[2]Mine Safety and Health Administration, 4015 Wilson Boulevard, Arlington, Virginia 22203.

[3]National Institute for Occupational Safety and Health, Building 1, Room 2047, 1600 Cliston Road, N.E., Atlanta, Georgia 30333.

2.3.4 Personnel who flame cut bottom plates of tanks that are suspected to have leaked should always wear positive-pressure air-supplied respiratory equipment.

2.3.5 Abrasive blasting or power wirebrushing are methods that will clean metal sufficiently for flame cutting. Personnel typically do not need to wear positive-pressure air-supplied respiratory equipment during the cutting operation if the metal has been cleaned.

2.3.6 Personnel engaged in abrasive blasting should wear air-supplied blaster helmets. Those engaged in power wirebrushing, and all other personnel in a tank while abrasive blasting or power wirebrushing is in progress, should wear NIOSH- or MSHA-approved toxic-dust and mist respirators. If the dust concentration exceeds the allowable limits of the respirators used, then air-supplied breathing equipment must be used.

SECTION 3—DISPOSAL PRECAUTIONS

3.1 Permanent Disposal

If the steel is to be discarded (for example by disposal in an approved landfill), no cleaning is needed except to remove heavy scale deposits that might create dust in handling or transporting. The permanent disposal methods employed must comply with local, state, and federal regulations.

3.2 Remelt

If the steel is to be sold for scrap and possible remelting in the manufacture of new steel, all interior surfaces of any plates that have been in contact with sludge should be abrasive blasted or wirebrushed to bare metal.

3.3 Material Safety Data Sheet (MSDS)

A Material Safety Data Sheet should be prepared for the used steel in accordance with the OSHA "Hazard Communication Standard" (see 1.3 for complete reference information). The MSDS should be given to the purchasers of the steel.

SECTION 4—REFABRICATION

4.1 General Precautions

If the steel is to be reused, the precautions to be taken will vary with prior exposure of the steel to sludge or with the amount of rust or scale present, with the structural shape of the steel, and with the intended use of the rebuilt tank or structure.

4.1.1 When thorough cleaning of the tank steel is required, it can be accomplished by abrasive blasting or power wirebrushing down to bare metal (free from all rust, scale, and other deposits) or by burning it at not less than 500°F (260°C). If time is not a factor, steel that has not been exposed to sludge can be placed on edge and allowed to weather until all scale falls off.

4.1.2 Precautions for flame cutting (see 2.3) should be applied when flame cutting is performed on steel that has not been cleaned and has been in contact with sludge, has been painted with lead-base paint, or is badly rusted or scaled.

4.1.3 Some safeguards are effected by stamping the steel with a precautionary label indicating that the steel has been in contact with lead antiknock compounds. However, this method of communication is not a positive means of preventing future difficulties or liability. An MSDS must be provided to the user or purchaser, as described in 3.3. The methods used for hazard communication must comply with local, state, and federal regulations.

4.2 Specific Precautions

4.2.1 The following precautions should be observed for the bottom ring of the shell, plates from the tank bottom, and any fittings that are removed:

a. They should not be used for any purpose until they have been burned, abrasive blasted, or wirebrushed to bare metal, and are free from all rust, scale, and other deposits.
b. They should never be used for the manufacture of containers for edible products (solid or liquid) for either animal or human consumption.

4.2.2 Tank shell plates above the bottom ring, roof plates, and other steels that have been in contact with leaded gasoline only and are free from heavy rust or scale (that is, are only slightly rusted) may be reused without cleaning. However, under no circumstances should this material be used for the manufacture of containers for edible products (solid or liquid) for either animal or human consumption.

4.2.3 Tank shell plates above the bottom ring, roof plates of cone-roof or solid-roof tanks, the upper deck of pontoon compartments, tank shell stiffeners of floating-roof tanks, and other steels that have been in contact with leaded gasoline only but are badly rusted or scaled should not be reused for any purpose until they have been abrasive blasted, burned, or wirebrushed to bare metal. Under no circumstances should

this material be used for the manufacture of containers for edible products (solid or liquid) for either animal or human consumption.

4.2.4 Angle or L-beam roof-supporting columns should not be used for any purpose until they have been abrasive blasted or power wirebrushed to bare metal. Under no circumstances should this material be used for the manufacture of containers for edible products (solid or liquid) for either animal or human consumption. Interior piping, such as swing lines and swing-line pontoons, and hollow roof-supporting columns should not be used for any purpose except for being cut into scrap for remelting (see 3.2).

4.2.5 Wood that has been saturated with gasoline should be disposed of by burning in an environmentally approved industrial incinerator or furnace.

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