1 Status

1.1 Update of existing policy, effective 11/18/11.

2 Purpose

2.1 To ensure safe operation of vacuum trucks used on our job sites

3 Applicability

3.1 This policy applies to all subsidiary companies and departments of The Cianbro Companies.

3.2 All organizations are required to comply with the provisions of this policy and procedure. Any deviation, unless spelled out specifically in the policy, requires the permission of the Corporate Safety Officer or designee.

4 Definitions

4.1

4.2

5 Policy

5.1 All subcontractors and/or Cianbro team members will meet the requirements of this policy, the client, and the manufacturer for the use of vacuum trucks.

6 Responsibilities

6.1 The top Cianbro manager on the job site is responsible for the implementation of this policy on the project.

6.2 The corporate safety department is responsible for maintaining this document.
7 Vacuum Truck Safety Index

7.1 Planning and Operation

7.1.1 A hazard analysis/Job Safety Analysis if required prior to performing the task and must be reviewed and signed by the crew. The hazard analysis must consider all of the hazards listed in Section 7.2.

7.1.2 If the subcontractor will be performing tasks on multiple days then a daily activity plan or equivalent is required each day.

7.1.3 Consult the manufacturer's instructions to confirm that the vacuum equipment is designed for the particular transfer operation.

7.1.4 Ensure that vacuum trucks, equipment, and loading/off loading sites are inspected prior to beginning the work to assure safe operations.

7.1.5 Emergency evacuation procedures must be reviewed with all team members prior to beginning the work each day.

7.1.6 Monitor tank-level indicators to avoid overfilling and over-pressurizing receiving tanks or creating excessive vacuum in supply tanks.

7.1.7 Run vacuum hoses out of walking and working areas if possible to avoid tripping on hoses and to avoid injuries due to movement of the hoses (can jump if there is a blockage). If hoses must be run in a walkway, then they must be secured so that they can't move unexpectedly. Avoid running hoses through doorways that are used for access.

7.1.8 Set up equipment to minimize spills. Follow the site spill plan if a spill occurs. Consider using collapsible drive on containment underneath the trucks.

7.1.9 Noise levels can be very high around these trucks. The noise level at the operator's control panel is likely to exceed 85 dBA and the levels in other areas around the vehicle will be even higher. Noise levels can still equal or exceed 85 dBA up to 300 feet away. In addition, the noise levels around the vacuum hoses can easily exceed 85 dBA especially where the hose changes diameter. Ensure the operators and other personnel in the area are adequately protected from the noise. To protect team members from the noise, keep all unnecessary team members outside of the high noise areas. Use noise monitors to determine the limits of the high noise areas if a monitor is available. In all cases, remind team members to follow the rule of thumb for noise: If you have to raise
your voice to carry on a conversation with the person beside you, then the noise level is at or above 85 dB.

7.2 Potential Hazards

Vacuum truck owners and operators, must be aware of the numerous potential hazards associated with vacuum truck operations in petroleum facilities, including but not limited to:

- Sources of ignition
- Flammable atmospheres
- Potential hazards associated with the surrounding area
- Toxic vapors and their PEL's and STEL's including H2S
- Hazards of mixing of materials
- Slips, trips, and falls
- Spills and releases
- Fires and explosions
- Accidents within the facility or on the highway
- Suction at the end of the hose
- Inadvertent movement of hoses walking or working areas
- Noise
- Body position and ergonomics when handling the hoses
- Working in confined spaces

7.3 Permits

Before beginning operations, vacuum truck operators shall obtain any permits required by the client. If the client does not require permits, it is recommended that we require a hot work permit for operations involving flammable liquids and potentially flammable atmospheres prior to bringing the truck into the area.

7.4 Flammable and Toxic Vapors and Atmospheric Testing

7.4.1 The areas where vacuum trucks will operate must be free of hydrocarbon vapors in the flammable range.
7.4.2 The areas where the vacuum truck operator and others work without respirators must also be at or below air - contaminant PEL's/STEL's.
7.4.3 If there is any question whether the area is vapor-or toxic gas free, atmospheric testing shall be performed by a qualified person using properly calibrated and adjusted detectors. Testing shall be conducted prior to starting any operations, and if necessary, during operations, including but not limited to the following: When operations in the area are subject to change such as automatic pump start-up or product receipt into, or transfer out of, a tank located in the vicinity of the transfer operations; when off-loading; when atmospheric conditions change such as wind direction, when an emergency situation, such as product release, occurs in within the facility that may affect atmospheric conditions in the transfer area.
7.4.4 Maintain a log of transported fluids and any potential residue to identify any possible chemical reactions from mixing.

7.5 Use of Conductive Hoses and Materials

Vacuum hose constructed of conductive material or thick walled hose with imbedded conductive wiring, shall be used when transferring flammable and combustible liquids when the potential for a flammable atmosphere exists in the area of operations. Conductive hose shall provide suitable electrical conductance less than or equal to 1 mega ohm per 100 feet (as determined by the hose manufacturer). Thin walled metallic spiral wound conductive hoses should not be used because of the potential for electrical discharge through the thin plastic that covers the metal spiral.

7.6 Bonding and Grounding

7.6.1 The complete vacuum transfer system needs to be bonded so that there is a continuous conductive path from the vacuum truck through the hose and nozzle to the tank or source container and grounded to dissipate stray currents to earth (ground).
7.6.2 Always ground the truck. Prior to starting transfer operations, vacuum trucks need to be grounded directly to the earth or bonded to another object that is inherently grounded (due to proper contact with the earth) such as a large storage tank or underground piping. A safe and proper ground to earth may be achieved by connecting to any properly grounded object including but not limited to any one or more of the following examples: a metal frame of a building, tank, or equipment that is grounded. An existing facility grounding system such as that installed at a loading rack. Fire hydrants metal light posts, or underground metal piping with at least 10' of contact with earth. A corrosion free metal ground rod of suitable length and diameter (approximately 9' long and 5/8-in. diameter), driven 8' into the earth (or to the water table, if less).

7.7 Venting

Under normal conditions, the absence of oxygen minimizes the risk of ignition in a vacuum truck. However, operating rotary lobe blowers and vacuum pumps at high speeds creates high air movement and high vacuum levels, resulting in high discharge air temperatures and high discharge vapor concentrations that can present potentially ignitable conditions. In addition, inadvertent mixing of chemicals can occur in the truck which can produce toxic or flammable vapors.

7.7.1 The following methods can be used by vacuum truck operators to safely vent vacuum pump exhaust vapors:

- Locating the vacuum truck upwind of vapor sources and by extending the vacuum pump discharge away from the diesel engine air intake.
- Vapors may be returned to the source container using conductive and closed connections; vapors may be vented into the atmosphere to a safe location using a safety venture.
- Vacuum truck operators may provide vertical exhaust stacks, extending approximately 12' above the vacuum truck (or higher if necessary), to dissipate the vapors before they reach ignition sources or other potential hazards and personnel.
- Vacuum truck operators may attach a length of exhaust hose to the vacuum exhaust that is long enough to reach an area that is free from potential hazards, sources of ignition, and personnel. The hose should be preferably extended 50' downwind of the truck and away from the source of the liquids.

7.8 Manual handling of Hoses

When the hose is handled manually, you must have systems to protect from the suction created at the hose end.

7.8.1 Vacuum Release

- There are three release areas available with a truck, including a remote release, a manual release near the truck itself and an inline "T."
- The larger the diameter of the hose, the bigger the force you have. If a 27" hose gets stuck to your body it can be fatal.
- An inline "T" is the mechanical device placed in the hose near the suction end that kills the vacuum in the hose.
- Nearly every injury in our industry occurs because those devices aren't working or aren't operative. If all 3 are working, you won't have injuries.

7.8.2 Ergonomics and body position

Consider the following to reduce exposure to ergonomic hazards.

- Use mechanical means to handle hoses and equipment whenever possible.
- Get help to move hoses and equipment.
- Rotate workers between jobs that have different muscle group requirements.
- Train team members to work with their body in neutral positions.
7.9 Training

7.9.1 Vacuum truck personnel shall be:

- Trained in the safe operation of the vacuum equipment.
- Familiar hazards of the petroleum products, by-products, wastes and materials being transferred, aware of relevant government and facility safety procedures, the contents of this policy, and emergency response requirements.
- Contents of the MSDS’s for the products they are handling.
- Trained in the use of required PPE for the products they are handling.
- All personnel shall leave the vacuum truck cab during loading and off-loading operations.
- When transferring flammable liquids or hazardous materials, vacuum truck operators shall remain positioned between the vacuum truck and the source or receiving tank, vessel, or container and within 25’ of the vacuum truck throughout the duration. Vacuum truck operators shall monitor the transfer operation and be ready to quickly close the product valve and stop the pump in the event of a blocked line or release of material through a broken hose or connection;
- Remove any other source of ignition within at least 100’ if the possibility of flammable vapors exists (depending on local procedures and atmospheric conditions of the truck, the discharge of the vacuum pump, or any other vapor source).
- Trained in the requirements of confined spaces if have to enter tanks, vessels, manholes, tank of the vacuum truck, etc.

7.10 Qualified Operators

Vacuum truck operators shall be trained and properly licensed in accordance with applicable regulations:

7.10.1 Vacuum trucks shall not enter into tank dike area until such areas have been checked/monitored and rendered safe.

7.10.2 Vacuum trucks cargo tanks shall be depressurized.

7.10.3 Vacuum truck operators must be aware of the effect of speeds, turns and the changing center of gravity.

7.10.4 Vacuum truck operators shall maintain proper distances when operating vacuum trucks inside facilities with restricted clearances.

7.11 Required Documentation

The following documentation must be obtained from the Vacuum Truck subcontractor prior to starting work. These requirements are in addition to documentation required of all subcontractors such as proof of insurance and a written safety program.

7.11.1 A hazard analysis/JHA for Vacuum truck operations.

7.11.2 Proof of Training for hazards associated with the operation of vacuum trucks including the possibility of both flammable and toxic atmospheres.

7.11.3 Proof of training and/or certification for the Truck Operator.
7.12 Waste Disposal

  7.12.1 Identify the generator Owner, subcontractor, Cianbro Corporation if it is our waste.
  7.12.2 Ensure the waste goes to the proper disposal facility.
  7.12.3 Keep copies of all shipments. Send the originals to the Corporate HSE Manager if Cianbro is the generator.

8 Budget / Approval Process

  8.1 All costs associated with this policy are the responsibility of the jobsite.

9 Related Documents

  9.1 Documents available on Cianbro.net