

PUBLIC COMPANY ORLEN LIETUVA

APPROVED BY
Director of Quality, Labour Safety
and Environmental Control

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OCCUPATIONAL HEALTH AND SAFETY PROCEDURE BDS-29 EQUIPMENT ISOLATION

I. GENERAL PROVISIONS

Purpose and Scope of Application

1. Occupational Health and Safety Procedure BDS-29 'Equipment Isolation' (hereinafter – the Procedure) aims to define the occupational health and safety requirements (hereinafter – OHS) associated with isolating serviced or maintained equipment in Public Company ORLEN Lietuva (hereinafter – the Company) from actual or potential hazardous energy sources.

2. This Procedure applies to all Company employees involved in organizing, planning and/or conducting energy isolation activities as well as to contractor employees that perform maintenance on Company equipment (where so required by a contract concluded between the contractor and the Company).

3. The requirements established herein shall not apply to:

3.1. Performing short-term unit repair and/or maintenance works (e.g., cleaning of rotoformers and water filters at Elemental Sulphur Production Unit, replacement of meters and automation instruments on level columns, replacement of control and/or safety valves), when the executors can keep all the closed valves and/or inserted blinds under control all the time, and, upon work completed, all the inserted blinds are removed immediately, valves are opened, and the unit is placed to operation;

3.2. Removing and/or inserting blinds from/into process equipment (pumps, storage tanks, heat exchangers, towers, pipelines, etc.) drain system drains and vents, which are connected with a common header to a tank, and the tank is connected via a breather to the atmosphere;

3.3. Performing works with electric equipment, devices or tools, whose power is controlled by disconnecting such from the power mains (e.g., pulling out of a plug), and the plug is controlled by the employee performing repairs and/or maintenance.

II. REFERENCES

4. This Procedure has been prepared in consideration of the provisions of PKN ORLEN S.A. Standard S2 'Safe Isolation of Energy Sources'.

III. TERMS, ABBREVIATIONS AND DEFINITIONS

5. Terms used herein are defined as follows:

Requisition submitter – employee operating process equipment appointed by a decree of manager of respective organizational unit and authorized to submit requisitions to

electrical workers. This employee is authorized to submit requisitions only in the organizational unit where he/she operates the process equipment;

Double isolation – type of energy isolation where two in-line valves are closed and a drain valve located between them is opened; it is used as alternative to blinding;

Energy isolating devices (hereinafter – **EIDs**) – mechanical devices that physically prevent the transmission or release of energy (a manually operated valve, blind, electric switches, etc.);

List of energy isolating devices (hereinafter – **EID list**) – a list of all energy isolating devices required to isolate a piece of equipment from hazardous energy sources (sample form is provided in Annex 1 hereto);

EID lock – a lock used with or without other special devices (cables, clamps, etc.) to lock an EID and to keep it in a set position. **Lockout/tagout initiator's** and **work manager's locks** – devices used to lock a group lock box.

Colors of locks:

- **Green color** – locks used by operational staff to lock up EIDs and locks used by lockout/tagout initiators to lock up a group lock box;

- **Blue color** – locks used by work managers to lock up a group lock box.

Group lock box – a special box used to keep the keys of EID locks placed over isolated equipment;

Mechanical disassembly – an energy isolating means (device) alternative to a blind where a pipeline section, equipment is demounted, or fittings (slide, valve, etc.) are removed. Use of this EID is not subject to the requirement in Item 6.2 hereof regarding locking out and tagging out of the EID;

EID tag – a warning device attached on an energy isolating device. **Lockout/tagout initiator's** and **work manager's tags** – tags attached together with locks on a group lock box (Annex 2 hereto);

Equipment – any piece of equipment (vessel, pipeline etc.) that may be dangerous to workers due to energy stored inside the equipment or energy supplied to equipment from other sources;

Isolated equipment – equipment isolated from hazardous energy using EIDs, which are locked out and tagged out and all required documents completed in accordance with the requirements of this Procedure;

Switching devices – electrical equipment designed to connect or break the electrical circuit. Usually, switching devices are turned on/off to connect (or terminate) the power circuit between the power source and the electrical receiver;

Residual energy – any stored or secondary energy which exists or may occur in equipment (e.g. residual, product remainders, mechanical power accumulated in a gear (compressed spring), etc.);

Operational employee – an electrical worker who has the right to carry out operational maintenance and/or operational switching of the Company's electrical equipment;

Air and drain valves – all valves used for draining, flushing, steaming and purging of equipment;

Hazardous energy – electric, mechanical, hydraulic, pneumatic, chemical and/or thermal energy which may cause injuries to employees;

Source of hazardous energy – dangerous chemical substances of different temperature, pressure and state contained inside equipment, electric power used by equipment, rotating parts of equipment, steam and hot water contained inside equipment, also any other hazardous energy used by or stored in equipment;

Lockout/tag initiator (hereinafter – **initiator**) – Company employee responsible for isolating equipment with EIDs (manager of organizational unit operating process facilities – Head of Operations, Deputy Head of Operations, Head of Shop, Head of Unit, Head of Section or other relevant manager, engineer appointed by a unit manager, in the Power Plant – employee authorized to issue assignments and in cases foreseen in this Procedure – shift supervisor);

Lockout/tagout inspector (hereinafter – **inspector**) – shift supervisor of an organizational unit operating process facilities (senior process unit operator, process unit operator, senior petroleum product operator, petroleum product operator, senior boiler and turbine operator, senior chemical water treatment operator, etc.) appointed by a unit manager, who is initiator as defined herein, to check isolated equipment. Such appointment is executed by making a respective entry in the logbook of decrees;

Maintenance works – equipment maintenance, installation, adjustment, inspection, replacement and other activities during which an employee may be exposed to hazardous energy contained in equipment. Such activities do not include daily operation of equipment. In cases specified in OHS procedures permits are required for maintenance, depressurization, hot works and / or works in confined spaces (hereinafter – the permit). For performing works at the Company's electric installations, assignment shall be issued for such according to the Safety Rules for Operation of Electric Facilities, as approved by the Minister of Energy of the Republic of Lithuania.

IV. ROLES AND RESPONSIBILITIES

6. Initiator shall:

6.1. Identify hazardous energy sources and draw up an EID list prior to isolating equipment.

6.2. Organize the isolation of equipment using EIDs, lockout and tagout of EIDs.

6.3. With isolation completed, organize the inspection of equipment to make sure that it is free any residual energy and has been properly isolated as per EID list, locked out and tagged out.

6.4. Make sure that all keys of EID locks have been placed in a group lock box and attach personal lock and tag to the box.

6.5. Keep the box locked and tagged until the end of maintenance activities.

6.6. Upon completion of equipment maintenance, organize the removal of EIDs, EID locks and tags.

6.7. After removing the EIDs, locks and tags, organize the inspection of equipment to make sure that all EIDs have been removed and all air and drain valves have been closed and blinded off, i.e. blinds installed, plugs inserted, etc;

7. When the head of a unit is the lockout/tagout initiator, he may entrust the inspection of isolated equipment as per Articles 6.3 and 6.7 hereof to **an inspector who shall:**

7.1. Upon isolation completed, check the equipment and make sure that it is free any residual energy and has been properly isolated as per EID list, all EIDs have been properly locked out and tagged out;

7.2. After removing the EIDs, locks and tags, check the equipment and make sure that all EIDs have been removed and all air and drain valves have been closed and blinded off, i.e. blinds installed, plugs inserted, etc;

8. Work manager (when at Power House – work executor) shall:

8.1. Lock and tag the group lock box of isolated equipment for which the manager holds a work permit/assignment;

8.2. Lock and tag the group lock box of isolated confined vessel when entry to confined vessel is permitted under Sheet of Approvals for Work in Confined Space;

8.3. Upon repairs completed, remove his/her lock as well as tag off the lock box.

V. DRAWING UP AN EID LIST

9. An EID list must be prepared for each repaired equipment.

10. The EID list must include all EIDs that will be used for isolating equipment from all existing or potential hazardous energy, also all air and drain valves that will be used for draining, flushing, steaming and purging of equipment but will not be used as EIDs.

11. A principal isolation diagram with indicated EIDs, their locations and air & drain valves must be enclosed to the EID list. The diagram must specify the number of the EID list and must be signed by the lockout/tagout initiator.

12. Each EID and each air and drain valve must have a reference number to be indicated in the EID list and the isolation diagram.

13. It is not necessary to enclose the diagram to the EID list in the following cases:

13.1. There are valid diagrams prepared and approved by the head of a unit where EIDs, air and drain valves used for equipment isolation are given respective reference numbers;

13.2. EIDs, air and drain valves are marked with reference numbers indicated in diagrams. These reference numbers must be used when drawing up an EID list.

13.3. Diagrams are kept in the place of issue of work permits/assignments.

14. EID lists are entered in the register of EID lists of the particular organizational unit (Annex 3 thereto).

VI. ISOLATION OF EQUIPMENT USING EIDs

15. Prior to any maintenance activities, equipment must be isolated from all hazardous energy sources using EIDs. All hazardous substances are removed from isolated equipment by means of draining, flushing, purging or cooling to temperature of 40°C or below, de-energizing, etc.

16. The following EIDs shall be used to isolate equipment:

16.1. For depressurization activities, the repaired equipment must be disconnected from all pipelines and utility lines, whether in service or not, by manual valves. When using automatic or remote electric and/or pneumatic gate valves as EIDs, they must be put in manual control mode. Control valves and check valves cannot be used as EIDs. When the design of such valves does not provide for the possibility of transferring them to manual control mode, electric valves must be de-energized and air supply to pneumatic valves must be cut off. Control valves and check valves cannot be used as EIDs.

16.2. For performing maintenance, hot works and/or works in confined spaces, the repaired equipment must be disconnected from all pipelines and utility lines, whether in service or not, by blinds. Blinds must be installed as close as possible to isolated equipment.

16.3. During shutdowns of process units or separate sections thereof, enclosed vessels containing water or steam condensate can be isolated just with shut-off valves (i.e. not blinds) if pipelines connecting such vessels (common header) are isolated inside the battery limits from the main energy source with cooled water removed from pipelines and enclosed vessels.

16.4. Steam and steam condensate, water, air, nitrogen pipelines as well as steam and hot water tracers can be isolated just with shut-off valves (i.e. without blinds) if concentration of explosive substances in isolated repaired pipeline sections is below the lower explosive limit (LEL). It is required to reduce the pressure down to atmospheric in repaired pipeline and to open air and drain valves. If the shutoff valves are not tight enough, double isolation should be used or the repaired pipeline should be isolated by installing blinds. It is not required to draw up an EID list for the isolation of steam and hot water tracers.

17. After isolating equipment, each EID must be locked out and tagged out. It is not required to lock out and tag out air and drain valves.

18. Where blinds are to be inserted next to closed valves (e.g., when repairing control valves, pumps) and work executors can keep all the valves closed under the EID list under control all through the blinding process, it is sufficient to tag out the valves with no lock-out required. Once inserted, the blinds shall be locked out and tagged out. In case of double isolation, both valves and the in-between drain valve must be locked out.

19. Attached EID tags must be clearly visible.

20. If the equipment utilizes electricity or is heated with electricity, it must be isolated from hazardous electricity sources using EIDs.

21. When isolating equipment from hazardous sources of electricity, a requisition submitter must indicate in the de-energization requisition provided to the operational employees that the switching device must be locked up using an EID lock.

VII. SYSTEM ISOLATION WITH EID

22. So to reduce the number of EID lists and the quantities of isolating devices, it is allowed to use one isolation system for a group of equipment; e.g., to blind a train of serially connected heat exchangers in the inlet and outlet without inserting blinds into each heat exchanger provided that any hazardous substances have been removed from all the heat exchangers and connecting piping, all the system (train) has been cooled down to the temperature not higher than 40°C. Where system isolation includes isolation of confined spaces and such have to be entered by employees to perform work in them, a separate EID list shall be prepared for such confined space and the space shall be isolated from hazardous energy sources following the requirements in Section VI hereof.

VIII. ENERGY ISOLATION TEST

23. Isolated equipment is tested by opening air vents, drains, etc. To prevent injuries that may be caused by the residual liquid and/or pressure, air vents, drains and pipes are checked for clogging. This can be done by applying water, steam or nitrogen to equipment.

24. Where it is not possible to check for the presence of any residual energy (drain and air valves, etc. are absent) in the equipment isolated with in-line valves, blinding of such equipment requires additional safety precautions defined in Article 21 of the OHS Procedure BDS-6/1 'Equipment Depressurization and Maintenance Works'.

IX. ACTIONS WHEN ISSUING WORK PERMITS

25. Permit/assignment issuer is prohibited to use copies of EID lists for the issue of work permits/assignments because material changes could have been made to the original EID list (and to equipment as well). Permit/assignment issuer must attach a copy of the EIP scheme made using the original document (except for cases specified in Article 13 herein) to the respective work permit/assignment.

X. REPLACEMENT OF EID LOCKS AND TAGS

26. If EIDs, EID locks or tags have to be replaced for equipment under maintenance, permit/assignment issuer must stop all works under issued work permits/assignments and inform work managers to remove their locks from the group lock box. After all these steps are completed, the permit/assignment issuer informs the initiator about the required replacements. The initiator shall:

26.1. Unlock the group key box and organize changes associated with EIDs, their locking and tagging by entering such changes in the EID list;

26.2. Organize the verification of equipment to make sure that all replaced EIDs have been locked out and tagged out;

26.3. Place the keys of all new EID locks in the group lock box and attach personal lock and tag on the box;

26.4. Inform the permit/assignment issuer about the changes the work managers to attach their personal locks on the lock box and to resume works under the issued permits/assignments.

27. In case equipment thermal treatment is to be performed next to a locked out EID, the person issuing the permit / assignment shall make arrangements for temporary removing of EID locks and tags, also putting thereof back upon thermal treatment completed following the procedure established in Item 26 hereof.

28. If EIDs, locks and tags must be replaced on weekends, national holidays or non-working time of the initiator, the initiator may appoint a shift supervisor authorized to issue work permits/assignments by giving him in advance the key of the respective group lock box.

XI. REMOVAL OF LOCKS AND TAGS IN SPECIFIC CASES

29. If key is lost or if work manager fails to report the end of the works and to remove the lock from the group lock box and it is not possible to reach the work manager, the initiator may remove the lock and tag by issuing a lock removal report (Annex 4 hereto) that must be kept together with the EID list.

XII. APPOINTMENT OF SHIFT SUPERVISOR FOR EXECUTION OF DUTIES OF INITIATOR

30. Shift supervisor authorized to issue work permits/assignments can be appointed to act as initiators in the following cases:

30.1. Under a decree of the head of a unit, for isolation of certain equipment undergoing maintenance or depressurization. For that purpose a list of such equipment is prepared and approved by the head of a unit, an isolation diagram is prepared and approved by the head of a unit for each isolated equipment with indicated EIDs, their locations, air & drain valves. Employees appointed by decree are familiarized with such schemes.

30.2. At the initiator's verbal instruction (given by phone) in cases of emergency or any other unforeseen circumstances (e.g. imminent shutdown of a process unit) when the initiator is absent from work (outside his working hours, on weekends, holidays, etc.). Shift supervisor must enter this instruction in the shift logbook or logbook of decrees.

XIII. ACTIONS AFTER COMPLETING MAINTENANCE WORKS

31. Initiator must organize the inspection of equipment and make sure that all maintenance works have been completed, no new work permits have been issued and all employees left the work site.

32. After conducting the inspection, the initiator must sign in the section '*Entry on completed maintenance works*' of the EID list, thereby prohibiting any further equipment maintenance works, except for removal of EIDs, EID locks and tags.

33. When all EIDs are removed from the equipment, the initiator or another inspector appointed by the initiator must visually inspect all EID places and after making sure that all EIDs have been removed sign in the section '*Entry on removed EIDs*' of the EID list.

34. Where necessary, organize the energization of equipment by submitting a requisition to the operational employees.

35. If there is no need for energizing the equipment and the electric circuit remains cut off, the requisition submitter must request the removal of lock from the switching device.

XIV. CUSTODY OF EID DOCUMENTS

36. EID list must be stored at the organizational unit for the period of its validity and for at least 30 days after removing the EIDs. In case of accident, incident or emergency resulting from improper equipment preparation, EID lists must be submitted to the incident investigation commission.

37. The register of EID lists shall be stored at the organizational unit for the period of its validity and for one more year after its expiry.

XV. EMPLOYEE TRAINING

38. The Company employees subject to the requirements thereof are required to pass a test on this Procedure pursuant to the OHS indoctrination requirements of the Company.

39. Contractor's workers must be indoctrinated on the requirements established herein in accordance with the contractor's procedures.

XVI. FINAL PROVISIONS

40. The present Procedure defines only the basic equipment isolation requirements and therefore all employees involved in equipment isolation must be familiar with and follow the requirements laid down in other valid OHS procedures of the Company.

41. Responsibility for periodic review and updating of this Procedure, if needed, shall lie with Director of Quality, Labour Safety and Environmental Control.

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[illegible]

Part B. EQUIPMENT ISOLATION FOR MAINTENANCE, HOT WORKS AND/OR WORKING IN CONFINED SPACES

[illegible]

I have checked and made sure that the equipment is isolated from hazardous energy, the EIPs are locked out and tagged out and the equipment is free from any residual energy.

(inspector's full name, signature, date)

I hereby give my permission to issue work permits/assignments for **maintenance, hot works and works in confined spaces**

(initiator's full name, signature, date)

Part C. LIST OF AIR AND DRAIN VALVES USED FOR ISOLATION OF EQUIPMENT

[illegible]

* - to be specified only in case of double isolation

ENTRY ON COMPLETED MAINTENANCE WORKS

I have checked and made sure that all planned equipment maintenance works have been performed, all workers have completed the works and abandoned the worksite, no new work permits/assignments have been issued and therefore I give **my permission to remove locks, tags and EIDs**

(initiator's full name, signature, date)

ENTRY ON REMOVED EIDs

I have checked and made sure that **all EIPs are removed, all air and drain valves are closed and blinded off**

(inspector's or inspector's full name, signature, date)

Energy isolating device tag - obverse



Lockout/tagout initiator's tag - obverse



Work manager's tag - obverse



Energy isolating device tag - reverse



Lockout/tagout initiator's tag - reverse



Work manager's tag - reverse



(Sample form)

[illegible]

LOCK REMOVAL REPORT
(Sample form)

List of energy isolating devices No. _____

Date and time of lock removal _____

Place of lock removal _____

Person responsible for the installation of lock _____

Lock removal causes _____

I have checked and made sure that the lock can be safely removed and this will not jeopardize the safety of workers and will not result any hazardous energy leaks.

Lockout/tagout initiator _____
(Full name, signature)