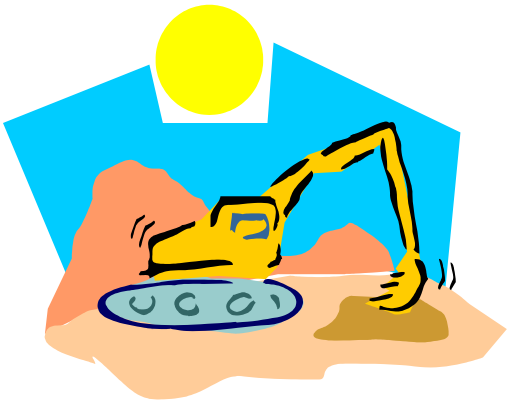
Subpart X
General Technical Issues

(Part II)

Run-On and Run-off Controls



Applies to all outdoor units.

Indoor units also need to address to prevent releases.

Precipitation Covers

- Burn pans should be equipped with a precipitation cover.
- The covers should be tight-fitting and remain on the burn pans during non-operational periods to prevent accumulation of precipitation and wind dispersion of any ash and residue.

The design of a cover needs to address:

Ease of movement – handles, wheels

Worker safety

Maximum coverage of unit

Retention of any residual heat

Prevention of Accumulated Precipitation in Burn Units and Detonation Areas

- Treat only during good weather conditions.
- Operation plans need to address if rain accidentally occurs during a treatment event.
- Run-on and run-off controls are required for units incorporating the earth.

Accumulation of precipitation within the treatment unit or zone could provide a means of release of ash or waste to the environment and could also prevent complete thermal treatment of the waste.

Rain accumulation during any treatment operation is minimized, by conducting treatment only at times when precipitation is not expected.

Berms need to totally surround OD ranges.

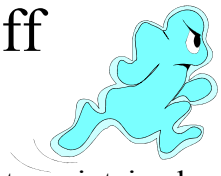
Rain During Open Burning Operations

- If water has accumulated in the pans, prior to loading, it is drained out into an appropriate container prior to a burn.
- Following a waiting period (based on safety considerations) after the burn, the pan is inspected and its cover replaced.

Run-on Collection

- Collection
  - If water has accumulated in the pans, it is drained out into an appropriate container prior to a burn.
  - The precipitation is removed with the ash and is considered part of the waste.
- Sampling
  - The water is sampled by the Environmental Management Office personnel.
  - It is placed into hazardous waste storage until analysis can be reviewed to determine the correct disposition of the water.

Run-on and Run-off Controls



- OD ranges need to have topography gradients maintained to prevent ponding.
- Since hazardous waste constituents remain in the soil treatment zone at OD ranges these contaminants can be washed out overland or leached through the soil.
- Berms and sedimentation ponds should be in place to collect run-off.
- OB ranges have to have controls to maintain any contaminated soils from popout and fallout from leaving the treatment area or causing leaching through the soil.

Controls at Mechanical Units Inside Buildings

- Contingency plans must be in place for any spills or leaks from the unit.
- Curbing, sumps, and concrete coatings help control releases to other areas.
- Concrete is porous and can have further problems if cracked, or improperly sealed.

Even though a unit is inside a building, contingency and prevention plans need to show releases will be prevented. This is done through maintenance and design. General designs for other indoor units should be considered.

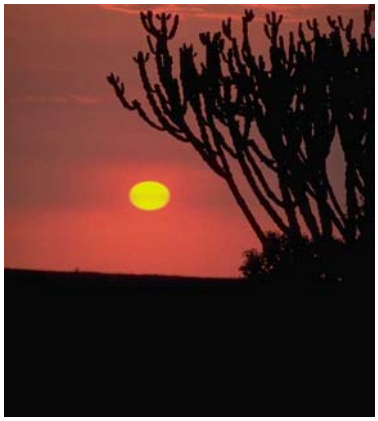
Special Operational Conditions: Air Space

- The facility must ensure that all detonations have ceased when aircraft approach the area. Or a no fly zone established.
- Designated observers must have effective communications with the Range Supervisor any time an aircraft approaches the area.

Consideration for migrating animal species also needs to be considered in the risk assessment. If the species is endangered or threatened special operational conditions might be imposed during migration periods.

An animal species does not recognize signs or no fly zones. Example: Butterflies going through a burn area and killed.

Operation Timing



- OB/OD and outside treatment only during daylight hours.
- May have to consider timing of noise or emissions to neighbors.
- Mechanical units are based on production schedule if located inside a building.

Operational Limits: Daily & Annually

Limits should be placed for how much the unit can handle.

- Its throughput capacity.
- Mechanical process limitations.
- Human limitations.
- Seasonal limitations.

Applicable to all types of units.

Seasonal limitations would include known periods when snow or cold would occur. Open detonation would be limited due to certain temperature effects on the munition treatment, or operation of digging pits.

Operation Waste Limits

- DAILY: Chart the number of devices per day, number of burns or detonations, amount and type of waste in each device and totals for the treatment area.
- ANNUALLY: Take daily information and extrapolate to annual schedule of treatment.

Charts are easier to use, but any format can be used.

Annual limits will consider days of the year that operations would not take place.

Example Daily Waste Limits

- Detonation example:
  - No more than 19 pits are used.
  - A maximum of 750 lbs. NEW per pit, including donor, is used.
- Burn example:
  - A maximum of 12 pans are used per day,
  - 2 burns conducted per pan, per day.
  - The maximum amount burned is 1,000 lbs. NEW per pan.

Example is from a Utah permit application.

Example Annual Waste Limits

- Detonation example
  - Approximately 120 detonation days per year.
  - The annual NEW is approximately 1,710 short tons (including donor);
  - The annual gross weight is 3,528 short tons (including donor).
- Burning example
  - There are approximately 120 burn days per year.
  - The annual OB treatment gross and NEW quantity are approximately 1,200 short tons.

Adding Waste Types

- Any additional munitions are considered on a case-by-case basis for explosive limits.
- Additional wastes should have agency approval since they may not be included in the risk and air assessments.

If it is determined that the munitions are of greater explosive quantity or different type, additional tests will be conducted to determine debris/fragment throw range.

A 20% factor is added by some facilities to the maximum throw range as a safety factor.

Vegetation Clearance

Applies to outdoor units.

OB/OD Area Preparation: Vegetation Clearance

- Dry grass, leaves, and other extraneous combustible material in amounts sufficient to spread fires are removed within a facility designated distance from the treatment devices.
- Example: a radius of 61 meters (200 feet) from pans.

Communications

- Telephone or two-way radio communications are established and remain in operation during the entire treatment operation.
- Near the wastes hand signals may be used for safety reasons.
- Signals, flags, and road barriers are used to identify active operations.

Necessary for all units in the preparedness and contingency plans.

Operational SOPs should describe hand signals and other communications that will be used during a treatment operation.

Mechanical units must have special provisions for protection of workers adding wastes, so that they do not get caught into the unit, or fall into the unit. Design safety features should address these issues. Safety control stopping buttons or devices need to be in place should an accident occur.

Treatment Process

All units need to have the process explained in detail with Standard Operating Procedures (SOPs).

Standard Operating Procedures

- SOPs must be included in the permit application.
- SOPs detail exactly how treatment operations will be performed.
- SOPs need to be site-specific, not generic.

SOPs need to be like a “cook book”, giving step-by-step directions on procedures.

The reason why they need to be specific is if someone familiar with the operation needs to be replaced, the next person will follow the same SOPs.

SOPs need to be updated as new safety and research information is discovered. An annual review might not be a bad idea.

Open Burning

OB Treatment -- Loading

- Cages and primer pits will have a fire box started prior to waste loading. Waste loading will be done through a shoot system.
- Pans will be loaded with the wastes first, then the donor charge. Amounts based on the type of wastes.

Safety precautions need to be made to ensure that shoots can be kept clear throughout treatment.

Operations that pour munitions (powders), need to consider safety of the operator, physically, and prevention of any static during the operation.

Pan Loading Example

- The propellant is poured into the pans with extreme care taken to prevent the occurrence of spills.
- The propellant is placed in the pan to a thickness no greater than 7.5 cm (3 in.).
- The area is then cleared of all personnel except for those needed to install the igniting charge into the pans.

Photo of dynamite loading in a pan.

Safety During Treatment

- The burning operations are observed from a safe position.
- Fire fighting equipment is made available to combat grass, brush, or equipment fires.

Treatment Effectiveness

- Qualified personnel check the burning device and ensure that all munitions have been burned.

Open Detonation

Open Detonation

Placement of Wastes in the Detonation Area

- Any pre-packaging of wastes into a containment device.
- Digging any pits.
- Transportation to the pit.
- Placement inside the pit.
- Setting the donor charge.

The application should describe:

How wastes are transported to the treatment area.

Any packaging for treatment in containment devices.

Any temporary storage areas.

Loading procedures into or on the ground.

For example, the munitions are on pallets that are transported to the OD pit via forklift or roller conveyor.

Distances and Placement of Donor Charges

- Donor charge
  - Amount depends on waste.
  - Placement on the waste depends on containment or placement of wastes.
- Describe distances between:
  - Wastes temporarily stored when brought to the unit.
  - Packaging operations.
  - Digging operation and incoming wastes.
  - Treatment pits filled with wastes.

The SOPs should specify separation distances to be maintained between unpack operations and materials stacked in the OD pit. (ex: 10 feet minimum)

The placement of the initiating charges and the amount of initiating charge are determined by the amount and nature of material being treated and should be specified in the permit application.

Unexploded Ordnance (UXO) Prevention

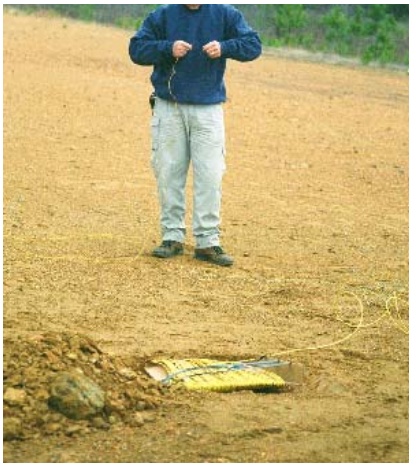
- The procedures in place to reduce the likelihood of UXO being ejected from the OD area should be described.
- Ensuring complete combustion by placement and containment of wastes and donor items is critical to ensure maximum treatment and the least UXO and scrap creation.

Facilities that just pour munitions into a pit are more likely to have UXO than those that try and containerize or package the wastes together.

Burial or Containment Method

- Burial Methods
  - Type of equipment
  - How donor materials will be kept in place and not disturbed
  - Set up of ignition devices
  - Monitoring systems to ensure treatment takes place
- Silos and concrete pits
  - Containment equipment (screens, locks, chains, etc.
  - Placement SOPs

Detonation



- Munitions are detonated by either non-electrical or electrical methods.

Verification of Treatment

- Use sound signals and other visual devices to watch treatment occurrence.
- Silo & Concrete Pits
  - Whole missiles or other munitions may have to be managed as a solid waste.
- Burial Method
  - Walk over all of the treatment area.
  - Look for UXO and other debris

Burial Method:

Metallic materials such as shell fragments (shrapnel) and occasionally pieces of energetic materials or UXO that were not completely treated during OD.

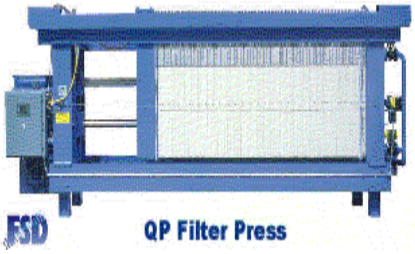
The OD area is inspected for these materials following OD.

After each day of detonation operations, a visual search of the surrounding area is made for unexploded munitions.

Mechanical Treatment Process Crushers and Shredders

- Waste enters unit by drum or bulk.
- Atmosphere needs to be controlled.
- Drums are deheaded and emptied prior to shredding.
- Drums can be crushed and washed separately.
- Management of liquid, solid, and metal wastes during the process.
- Compatibility and cleaning an issue if waste types are mixed.
- Feed rate needs to prevent clogging.

Mechanical Treatment Process: Filter Presses



- Wastes enter through piping.
- Liquid exists through piping to waste water treatment or tank storage.
- Solid cakes are formed and fall into roll-off boxes under unit.

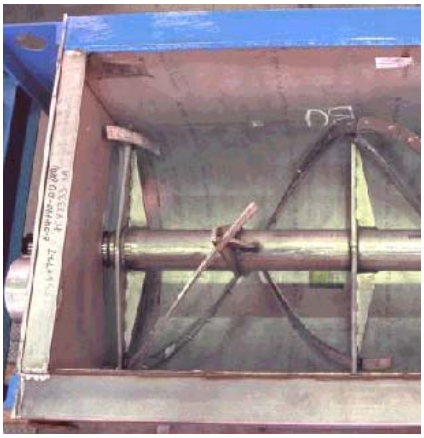
Wastes can be liquid or semi-solid.

Plastic or cloth sheeting is used to prevent wastes from splattering during the falling and breaking process.

Solidification materials (ash or lime) typically added prior to entering the unit.

Solid material should pass free liquids testing.

Treatment Effectiveness of Mechanical Units



- U.S.EPA SW-846 analytical methods can prove treatment effectiveness (in versus out).
- Physical separation occurrence without releases.
- Meeting definition of empty for drum crushers and washers.

EPA has written numerous policy memos providing clarification regarding the 40 CFR §261.7 definition of "empty".

These memos are available on the EPA web-site
http://www.epa.gov/oswer/rcraonline

Residual Management

Plans must be in place for any unit that produces treatment residuals.

Control of Releases of Ashes and Residues During OB

- Design the unit to hold any popout, or have secondary containment that can trap it.
- Anything that touches the ground and is not removed causes contamination.
- Wind barriers during cooling?
- Constant inspection.

The permittee must remedy any deterioration or malfunction of equipment or structures which the inspection reveals on a schedule which ensures that the problem does not lead to an environmental or human health hazard.

If propellant, waste, or ashes is ejected from the burn pan onto the ground during burning operations, environmental contamination via the soil, surface water, and ground water pathways may result.

Small Particulates from Any Burn

- Burning device design height, and screening for popout, can reduce releases.
- Removal of all particulates, not just “visible” ones.
- Collected material should be burned the same day, prior to leaving the site.

Permittees will tend to scoop up what is visible but this method might not clean all contamination. Secondary containment that can be cleaned more efficiently is a better option.

Ash, Scrap, and Residue Management

- Ash, scrap, and residue are gathered, containerized in an authorized container, managed as solid or hazardous waste, based on generator knowledge or testing, and stored.
- Some facilities have a satellite generator storage area for residual containers, others place the waste in smaller containers that are removed to a >90 day storage area.

Satellite storage areas should be included in the permitting of the treatment unit if they are in a contiguous area of the treatment operation.

Container or tank storage standards can be applied to these storage areas.

Container Management

- Metals must be certified explosive free and safe to recycle.
- Solid waste container requirements:
  - Be compatible with the waste.
  - Be in good physical condition.
  - Not contain free liquids.
  - Have a 3-in. head space between the lid and contents in the drum.
  - Be sealed with metal lids, gaskets, and rings with 5/8" bolts, if steel tops.
- All containers must be labeled with the following information:
  - Waste type.
  - Date the container is full.

The standards the facility uses to determine "explosives free" should be explained in the permit application.

Mechanical Unit Residues

- Wastes physically separated will be managed in a different physical form at the output of the machine. Wastes leaving the unit need to be contained and transported to another management area (stored, waste water treatment, sent off-site).
- Generators must characterized the wastes that are treated.
- Waste types typical of mechanical units:
  - debris
  - liquids
  - gases
  - metal
  - solids

SOPs and descriptions on how the residues will be managed need to be in the permit application.

Any ancillary transfer stations or storage near the unit should be included in the permit conditions.

Security At Every Subpart X Unit

- Restrict access to the unit by the use of warning signs, fences, gates, and a surveillance team.
- If the fence is around the entire facility, internal warning systems must also be in place such as signs, road barriers, warning signals, etc.

Inspections Apply To Every Type Of Unit

Every unit needs to have an inspection program. These are similar to the standard RCRA regulated units such as tanks, containers, etc.

The plans need to address timing of inspections, areas to look at, corrective actions needed, corrective actions taken, construction appearance, operational problems, surrounding area impacts and pollution control operations.

Environmental impacts need to be addressed in Subpart X inspections, including erosion, species, air quality, soil coloration, etc.

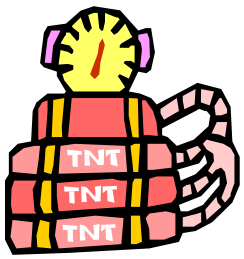
Inspection... Before the Burn

- The OB area is inspected to ensure that:
  - The burning devices do not have cracks, holes, or other leak sources, and
  - The immediate area is free of excess vegetation or other potentially combustible material.

Inspection…. After the Burn

- The burning devices are inspected for partial burns.
- If unburned material is discovered, it is subsequently re-burned, provided the device is safe.
- Otherwise, reburning operations are delayed overnight.
- Inspection procedures that are used must be in the application.

Inspection... Before the Detonation



- Visual inspection for unexploded munitions should occur.
- Detonation silos or concrete should be checked for integrity.
- Soil conditions, weather, noise and operating conditions must be met.
- Free of water, plant matter, glass, wood fragments, metal scraps, and debris, trash, obstacles, or tripping hazards.

Weather and vegetation checks are very important and can cause the operations to be delayed if there are problems.

Inspection…. After the Detonation

- Check the treatment area visually.
- Evaluate any wells or objects in close proximity that could be exposed to impacts.
- Evaluate what, if any, residuals need to be removed.
- Manage any residuals removed.

Check for complete treatment.

Look for and remove visible scrap, use safety precautions, handle as if a UXO.

Residual management plan needs to be followed.

Detonation pits need to be backfilled.

Nearby wells should be integrity checked if in close proximity to the treatment zone.

Sedimentation ponds need monitoring, cleaning schedules, discharge permits.

Inspection of Mechanical Units

- Visual inspections for leaks, and other releases must be performed.
- Mechanical units tend to require higher housekeeping standards, since larger volumes and physical handling causes more spillage.

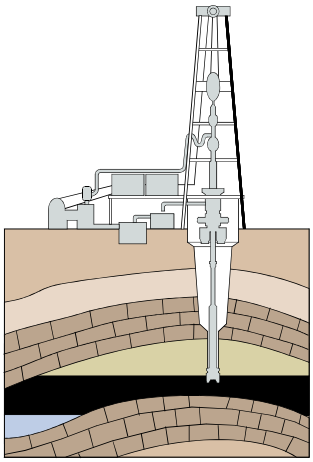
Inspection programs for mechanical units should look closely at maintenance procedures, how often they occur, and what corrective actions would be taken.

Wear and tear on the mechanical devices is also important to keep track of.

Inspection of Mechanical Units (cont'd)

- Verification of "empty" containers must be met according to U.S.EPA policies.
- Air monitoring equipment and other safety equipment must be maintained to prevent releases and combustible atmospheres.

Inspecting Other Subpart X Units



- Inspection checklists are going to follow some standard conditions to all units.
- Case by case conditions will be created to determine compliance with release prevention and monitoring for each type of unit.

Record Keeping Applies To Every Type Of Unit

Record Keeping

- The following data must be kept on-site at a minimum of 3 years:
  - All notifications,
  - Demonstrations,
  - Waste analysis data (including residues)
  - Certifications,
  - Manifests, and
  - Other relevant documentation

Discuss with your ecologist and toxicologist whether a longer period of record retention is necessary for supporting risk data.

Corrective Action
Applies to every TSDF

- A RCRA Facility Assessment must be completed prior to permitting.
- All SWMUs must be addressed in the public record.
- All SWMUs with releases or potential releases need to be addressed in permit conditions.
- Each media needs to be assessed for what actions are necessary.
- A schedule of compliance needs to be established.

If CERCLA and RCRA both apply, an agreement must be made on what program has the lead, and that whichever program, it addresses all RCRA issues. If a CERCLA order is satisfactory to the RCRA program for RCRA issues, then the order may be referenced for compliance in the permit.

New Corrective Action remediation methods should be watched for under the U.S.EPA Federal Facilities Program. Bioremediation is one area that has been seeing increased use for explosives.

Historical OB/OD Treatment

- Corrective Action at Military facilities tend to address problems like the following:
  - OB/OD activities have occurred since the 1940s.
  - Munitions were detonated in pits.
  - Propellants were burned in pans.
  - Past activities included burning munitions and other items in open trenches.
  - Trenches were back-filled when they became full.

Risk assessment may have to address previous contamination under current contamination from OB and OD operations. These are hard to separate. Corrective Action conditions may have to address cleanup to certain levels and permitting conditions for the operational unit to limit increased pollution into the same area.

End of General Technical Issues