

Standard Operating Procedures		SOP Ref:	SOP-18
Approved & Issued by:	Byron Smith	Written by:	Stuart McNish
Operational Area:	BKP Environmental Romsey, Transfer Station		
Title:	Waste Mixing & Blending		

1. Activity

This procedure outlines the safe management and testing prior to blending / mixing of any materials onsite from their original container into a larger container or bulk tanker. From initial representative sampling to desktop analysis and laboratory modelling and testing it is essential that the procedure is followed. Following this will ensure the necessary precautions and confirmatory tests are completed prior to any blending or mixing of waste materials. Only compatible materials of similar chemical nature will be bulked together and all materials will be assessed to determine suitability prior to any laboratory scale compatibility assessments being completed. The process is led by chemists onsite and all assessments are completed by them. Bulking / waste mixing may be completed by trained operatives once all laboratory assessments are completed under the supervision of a site chemist.

2. Persons at Risk

- Operators
- Site Chemists / Laboratory Chemists
- Drivers
- Contractors and visitors
- Office staff
- Adjacent Production Facility employees
- Emergency services staff

3. Procedures

1. Relevant Legislation & External Documents

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- Compatibility Testing Guidance for Bulking Operations in the Waste Treatment Industry – EA/HSE
- Environmental Permitting Regulations 2016
- Dangerous Substances & Explosive Atmospheres Regulations 2002
- HSG 176, HSG 51, HSG 71
- Chemical Waste: Appropriate Measures for Permitted Facilities
- SGN5.06
- Classification, Labelling and Packaging (CLP) Regulation GB (Inc GHS)

2. Relevant Reference Documents for Assessments

- Chemical Reactivity Worksheet (CRW) <http://response.restoration.noaa.gov/> - Useful for checking product compatibility
- EPA Chemical Waste Compatibility Chart
- Internal documents – Compatibility testing lab procedure – LTP-LAB-013, Site compatibility matrix (Appendix to this document)

4. Persons with responsibility and roles in Waste Processing onsite;

- Site Chemists/Laboratory Chemists – BKP

The Site chemists / process chemists are responsible for receipt of waste into the facility and ensuring the waste classifications and identification of what received mirrors the pre-acceptance information and the assessments made by technical assessors. They are responsible for sampling all wastes received directed by the pre-acceptance process and ensuring the samples are properly labelled for the laboratory to analyse as appropriate. The analysis needed is dictated by the technical assessors at the pre-acceptance stage. They complete non-conformances on wastes received once analysis is completed if it falls outside of the agreed specifications set at the quotation/pre-acceptance stage.

- Senior Site Chemist - BKP

The process chemists at the facility are responsible for preparing or supervising all blends. They will complete and manage the compatibility testing in conjunction with the laboratory chemists and select suitable materials from the stock inventory. They will work closely with the laboratory and technical assessment team and process operators to ensure that blends or mixtures produced are safely managed without incompatible reactions and that when processed these fall within the process emission limits. They will be trained and able to operate all of the laboratory equipment.

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- Site Manager/Transfer Station Manager – BKP

The Site manager maintains overall responsibility for the site and compliance and health and safety. This includes ensuring the inventory is managed effectively by the stock control manager and associated teams & all procedures are followed. They will have visibility across all departments including production and will ensure that waste is safely and compliantly managed through the facility. They will have a chemistry background and be able to assess potential blends if required in the absence of the senior site chemist.

- Technical Assessors – BKP

The technical assessors will be responsible for waste and Hazard assessments of inputs into the waste facilities. They will be HNC Qualified or above chemists and have relevant industry experience. They will often be Dangerous Goods Safety Advisors. Their job is to ensure that any waste received into the facility is classified in accordance with CLP and sufficient information is obtained to ensure that all relevant hazardous properties/hazard statements/proper shipping names/tunnel codes and COMAH codes are completed for all waste profiles into the facility. They will complete pre-acceptance information in accordance with the environmental permit and chemical waste appropriate measures guidance. They will engage with site management, the technical manager and laboratory manager and team and commercial teams to ensure all waste inputs are thoroughly assessed. Prior to acceptance they will confirm what materials are suitable for bulking / mixing prior to acceptance and also indicate to the operational team which materials are unsuitable based on their hazardous properties / potential reactivity. As part of their role they will denote the minimum level of PPE required for blending / mixing operations.

- Health & Safety / Compliance Manager – BKP

The health and safety and compliance manager will have oversight and responsibility for procedures and regulator compliance at the facility. They will conduct internal and external audits and work closely with the team onsite to ensure best practise is followed. They will have input with the site management team on all aspects of the facilities operation to ensure risks are properly assessed and managed for operations.

Health & Safety Considerations

- PPE must be worn for all bulking / mixing operations. This should be specific to the chemicals being bulked and indicated at the technical assessment stage. Details of minimum PPE requirements is included as an appendix 2 to this document
- Wastes containing any VOCs or Corrosive properties must be bulked within the LEV container onsite using the associated earthing and extraction.
- Toxic Wastes category 1 & 2 should only be bulked or mixed with substance specific risk assessment

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- Any containers >20Kg in weight should be mixed using mechanical devices and where possible manual handling should be avoided. The LEV cabinet is equipped with AODP and lances to enable this to be avoided
- Prior to any bulking / mixing taking place the area should be checked for cleanliness and spills to ensure no incompatible materials may come into contact with each other from spills. The Cabinet is designed to enable easy cleaning down if spillages occur and resultant wash waters pumped out using AODP.
- Bulking / Mixing must only commence once all checks have been completed. This is directed only by degree qualified chemists onsite and all analysis recorded.

5. Packaged Waste Liquids for Mixing / Blending

Overview:

The main objective of the waste mixing/blending process is to bulk like for like or similar chemical waste streams on different EWC codes into larger containers to efficiently send materials to third party disposal or recovery facilities efficiently. Examples of this may be solvents received on different EWC codes but insufficient quantities to process to make a full IBC container. This resultant mixture will be given a unique identifier associated with a batch sheet and the desktop and compatibility assessments to retain full traceability of the materials when leaving the facility. The resultant mixtures will leave BKP on a 19 EWC code denoting they have come from a waste management operation as a mixture with a unique label that links to the batch sheet and constituent components. The waste should be reassessed when leaving site based on the individual components that have been put into the larger container and the BKP lab analysis on the resultant mixture included in outbound load lists to disposal/recovery sites where required.

1. Waste Acceptance;

Packaged waste liquids and other physical forms are received through waste reception. They are analysed and checked for conformity by site chemists who sample every drum (or a composite of the same materials to produce a composite sample) to assess against caveats and acceptance criteria. The analysis is completed as directed by pre-acceptance for the packages by one of the laboratory chemists and the analysis is saved linked to each individual package. Packages will be weighed upon receipt and the weights recorded on the incoming paperwork.

A retained sample will be kept in the sample store pending treatment of the waste material if it is to be bulked / blended.

Confirming packages are put into designated storage areas by primary hazard for storage prior to onward treatment. The materials are put onto the stock inventory with the laboratory analysis completed onsite linked for each package.

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Non-conforming packages will be quarantined pending return or repricing / re-assessment if outside of caveats and formal non-conformances will be raised with the waste producer.

This is outlined in the waste acceptance procedure and non-conformance procedure.

2. Batching prior to compatibility or desktop assessment;

Senior site chemist or site chemists in their absence will select suitable materials for blends based on their knowledge, the chemical properties of the wastes and make up suitable batches of materials to meet the target specifications of inputs to the third party acceptance criteria depending upon the nature of the blend. Only like for like physical hazard materials will be bulked in-line with the compatibility matrix.

Senior Site Chemist will work using the pre-acceptance information on intended disposal route addition to lab analysis completed on the waste received as well as using the BKP compatibility matrix (Appendix to this document).

Blends will be made based on production requirements, either for third party recovery/disposal facilities and only bulking / mixing like for like physical hazards.

Chemists will assess stock available to make suitable blends in each storage bay based on the primary hazard of the packaged waste. The desktop batches produced will then undergo a desktop assessment analysis prior to any compatibility testing being completed. Typically a batch will consist of 1,000L to enable wastes to be bulked into IBC containers for efficient offsite disposal.

The stock inventory will include amounts of material in each container to enable sufficient material to be batched in each blend.

3. Desktop Assessment;

Any potential blends/mixtures will be assessed after a provisional blend list is produced by the process chemists for incompatibilities. Only all hazardous materials may be mixed or all non-hazardous materials may be mixed. **There will be no mixing of hazardous and non-hazardous waste.**

The assessment will assess all individual components for pH, Odour, possible reactions or incompatibilities that may produce an exothermic reaction or gas generation against the sites compatibility matrix. This will also consider the individual chemistry using the EPA chemical compatibility matrix and the CRW where appropriate.

The desktop assessment will take into account the potential for any gas generation, odour generation or exothermic reactions (such as from neutralisation) within the checks. No physiochemical treatment should occur during this operation so only materials of similar chemical nature can be mixed.

The senior site chemist will also review the onsite analytical data on pH, Flash point, Odour, Solids content, Halogens & Metal concentrations or any other specific analysis requested at the point of pre-acceptance from the acceptance analysis recorded on the server.

Once the desktop analysis has been completed it will be recorded and then checked.

Any materials that are likely to liberate flammable, toxic or malodorous gases or exothermic reactions or polymerisation will be excluded from further testing. If onsite laboratory data indicates that the information

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supplier may be inaccurate or concentrations are significantly lower or wastes are not as described. These materials may be put aside for further investigation / additional analysis or investigation by senior site chemist.

This secondary check forms the basis of a dynamic risk assessment prior to mixing of any samples in the laboratory in controlled conditions to replicate the potential mixing process onsite within tanks.

Once signed desktop assessment / batch sheets are agreed by senior site chemist and laboratory compatibility testing can be completed.

4. Compatibility Testing

Once all desktop assessments have been checked and recorded and process chemists and laboratory chemists are satisfied with the desktop assessments the laboratory scale compatibility testing can be completed.

The testing procedure follows the EA / HSE joint guidance for Compatibility Testing Guidance for Bulking Operations in the Waste Treatment Industry.

Representative samples of waste taken at acceptance should be available within the laboratory sample store to site chemists. If samples are not available process chemists will obtain representative samples of all the wastes within a batch.

Prior to completing compatibility test each mix should be given a unique identifier that links to the laboratory test data and the batch sheet. If multiple batches of the same mix are conducted within the laboratory these should be denoted as a number followed by a dash with the attempted number. I.e. SOLV123-2 – Indicates Solvent Bulk Number 123- Test 2.

Once samples are obtained they will be assessed by adiabatic calorimetry using a dewar flask as detailed within BKP-LTP-LAB-013 – Compatibility Testing within the fume hood in the laboratory. This is used as methodology for determination if any materials within a blend cause exothermic reactions within controlled laboratory conditions in adiabatic conditions in-line with EA/HSE Joint Guidance for Compatibility Testing for Bulking Operations in the Waste Treatment Industry.

Once compatibility assessment is completed and less than a 5 degree temperature rise is observed across the tests from the compatibility then material is ok for mixing to be completed on the actual waste containers.

A completed compatibility test form is retained with the information in the blend and the unique references numbers of everything that has gone into the blend chemically, volumes and EWC code. This should be stored as a paper copy and scanned onto the server locally as an electronic copy and saved against the unique batch number. This can be copied and given to chemists who will complete the bulking (or operator under supervision) showing the order in which materials are added. This order must be followed when the actual bulking/mixing takes place into larger containers.

Blends failing this test will not be bulked. Either components within them can be isolated as issue causing and processed via other means through the process or sent offsite for disposal. Non-conformances will be raised for any packaged wastes that cannot be processed through their intended route. Blends and materials in blends may be re-worked to make suitable blends that do not cause compatibility issues by process chemists.

5. Completing waste Mixing / Bulking

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Once desktop and laboratory testing has been completed and shows no adverse reactions for materials to be mixed together physical bulking into larger containers can take place. This is completed or under the supervision of site chemists.

Prior to starting;

Any flammable, corrosive or acutely toxic wastes should be bulked within the LEV container in the transfer station (A9). This is a self-bunded cabinet with earthing and extraction points and containment which is easy to clean. The cabinet is fitted with carbon filtration and impregnated carbon for any acid gases potentially released. It also provides LEV to minimise exposure to those completing the operation. This should be inspected and cleaned if necessary prior to use. It is tested in accordance with HSG258 and inspected / maintained as part of periodic maintenance checks by BKP Health & Safety Manager.

PPE required for completing the task is included as an appendix to this document. There is a PPE requirement board present outside the LEV stating minimum PPE requirement by chemical type for operations within the cabinet to protect employees whilst completing the task.

Any containers >20L in volume or 20Kg in weight should be bulked/mixed using Air Operated Diaphragm pump within the cabinet. The pump and associated pipework should be flushed with water prior to use by site chemists to ensure no incompatibilities within the pipework.

To Process;

Clean container of appropriate volume should be placed within the cabinet on the right hand side. If required to be UN this should be checked before use. The site operated a UN IBC reconditioning line and pressure tester so washed tested and inspected IBCs from this process can be used. If flammables are to be bulked this should be earthed using the Newson Gale equipment within the container.

Correct PPE worn by chemist based on nature of batch to bulk/mix including RPE and appropriate clothing if anti-static/corrosion resistant PPE required. This is managed by H&S Manager and Site Manager and Air Fed Hoods and filters are periodically changed and inspected.

Materials to be bulked added within the cabinet in their original containers. The references and the materials to be checked against the batch sheet. If flammables are to be bulked the containers to be emptied should be earthed with the newson gale equipment to discharge any static (there are 2 bond-rites present within the container).

Containers are pumped or emptied depending on their size in the order denoted on the batch sheet into the larger container. This should be done if not by pump and lance with bottom discharge with a funnel and pipe to avoid splash filling.

Once containers are emptied they should have lids replaced and be palletised for later treatment. Depending on the materials they may be washed with water within the cabinet and the residues added to the receiving waste container to enable the packaging to be recovered through the processes onsite.

If containers are washed they should be marked as "washed" and original label retained. If the containers are unwashed they should be palletised within the container and labelled as "empty unwashed" so operators/chemists can identify nature of hazards within them.

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Once all containers to be bulked within the batch have been emptied the receiving container (typically an IBC) should be labelled with the primary hazards and batch number on both sides prior to putting into a storage bay onsite. Once removed from the cabinet the IBC should be weighed. The container should be properly sealed and checked by chemist completing the bulking prior to it's removal as well as labelled with relevant ADR/technical information relating to the waste within it. All IBCs should have caps on their taps.

Once removed the container with it's new unique identifier should be added to the stock inventory system (including this identifier and the date the IBC was produced)

The chemist bulking them should observe if any reactions observe during the process. If any reactions occur (vapour, fuming, temperature increase, bubbling or effervescence) chemist should immediately cease operations and exit the cabinet. They should then ensure LEV still working and inform line manager. Following this an investigation should be completed by Health and Safety Manager to ensure process has been followed and identify root cause. This should be recorded on company health and safety management system.

Reporting

Volumes of material mixed/blended should be recorded by site chemists to allow annual reporting on volumes processed. These are saved individually within batch sheets produced for each IBC produced.

There is a 10,000 Tonne maximum permitted amount of material for this operation.

The site manager will be responsible for managing the limits of this activity.

Material to be transferred from smaller containers from larger containers all of the same EWC code is not considered mixing and volumes should be reported under repacking within the permit.

Signed off by:

..... Director / Manager / Supervisor

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