CALCIMA
California Construction and
Industrial Materials Association

September 18, 2013

Jeanine Townsend
Clerk to the Board
State Water Resources Control Board
1001 I Street
Sacramento, CA 95814

Re: Comment Letter – Draft Final Industrial General Permit

Dear Ms. Townsend:

These comments are offered on behalf of the California Construction and Industrial Materials Association (CalCIMA). CalCIMA is a statewide trade association representing the construction aggregate, ready mix concrete and industrial minerals industries in California. Our members operate over 500 facilities statewide providing the raw materials to fuel California's infrastructure needs as well as the needs of the construction, manufacturing and industrial sectors. We recognize the importance of protecting our waters but also need a regulatory structure that can be complied with and that achieves the objective of protecting our waters in an efficient manner.

Significant improvements have been made to the proposed permit since the previous draft and that is now much closer to an implementable permit system. The Draft Final Permit (Draft) is a significant increase in specificity and activity to the current Permit (Permit). While the structure has improved we continue to identify issues which should be resolved and clarified. A brief list of these is below with detailed discussions following:

Improvements to Draft:

- *NEL Process removed from Draft.* CalCIMA supports this action and believes the Draft's Numeric Action Level approach is at this time the only feasible permit path as we had commented on previous drafts.
- *Inspection Consolidation into Monthly Observations.* We appreciate that staff has consolidated these activities. The previous versions created a hard wired administrative burden that is resolved through this consolidation.

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- *Annual Report*. The new proposed system appears better than previous.
- *QISP Streamlining*. CalCIMA appreciates that the Board listened to industries significant concerns on the multi level QISP process and has streamlined the system to a single QISP as well as provided the opportunity for some professionals to qualify without taking a class in person, and without an exam.
- *Trade Secret Clarification*. The inclusion of a process for industrial facilities to provide trade secret information protection is appreciated.

Concerns /Areas Needing Improvement Clarification

- *Minimum BMP's*. Significant changes occurred to this language from the previous draft to this draft. It appears these changes were to promote consistency with the federal MSGP, however certain concepts such as practicability seem to have not been included. Some items would also benefit from clarification as we will discuss in detail later.
- *Effective Date*. The implementation of this Draft in the middle of a storm season creates significant challenges in implementation. It should have an effective date of July 1, 2015.
- *What is a violation*? In the Fact Sheet and Draft there are specific statements about being in violation that do not clearly take into account the sampling exclusions continued in the Draft. We detail these later with a proposed solution within the Fact Sheet language. We see these as clarifying changes.
- *Qualifying Storm Event*. As this language has been read by several of our members, it would potentially preclude sampling of some drainage areas at mining facilities. We offer a language solution to address this issue later in this letter as we understand such an interpretation is not the Boards intent.
- *Mining Specific Definitions and Clarification.* The Federal MSGP included several mining specific definitions that we believe are important for clarity to include within this MSGP. Specifically they define Active phase, Construction phase, Reclamation phase, Exploration phase, etc... The MSGP also clarifies that the MSGP permit covers discharges related to these phases. These clarifications also seem to be needed within this Draft to ensure appropriate compliance measures are taken from this industrial activity consistent with the Clean Water Act.
- *NSWD Clarification*. We believe water used for dust control should be clarified as an authorized Non Stormwater Discharge under the permit.
- *Inclusion of Best Industry Practice*. This additional concept which comes from the federal MSGP is an important inclusion in a permit that covers the vast array of industrial sectors covered under the draft.
- *303(d) Listed Waters and New Discharger Clarification*
- *Consistency Changes*. As we have reviewed the document we have come across some language inconsistencies between the fact sheet and Draft. To assist with editing we have listed these.

Table of Contents

Detailed Discussion:

Minimum BMP's:

Omission of Practicability from Footnote 11:

Our understanding based on discussions with staff and language within the Fact Sheet is that the minimum BMP language is intended to be consistent with federal language within the MSGP. We appreciate this consideration however practicability seems to have been omitted in translation.

Footnote 11*:*

For the purposes of this General Permit, the requirement to implement BMPs "to the extent feasible" requires Dischargers to select, design, install and implement BMPs that reduce or prevent discharges of pollutants in their storm water discharge in a manner that reflects best industry practice considering technological availability and economic achievability.

Federal MSGP "Control Measures and Effluent Limits"[1]

In the technology-based limits included in Part 2.1 and in Part 8, the term "minimize" means reduce and/or **eliminate to the extent achievable** using control measures (including best management practices) that are technologically available and economically **practicable** and achievable in light of best industry practice.

Discussion:

It seems clear the language referenced in footnote 11 is a restatement of the language from the federal MSGP. We note that it is beneficial within the Draft to include discussion of Best Industry Practice as was done in the federal MSGP due to the very large variety of industries covered under the Draft and therefore functional differences in what is feasibly implemented on a by industry basis. When we reviewed this language we noted that "**economically practicable**" was not included within the California Draft. As such we believe footnote 11 should be modified as follows to be consistent with the federal MSGP.

Footnote 11 Proposed Modification:

For the purposes of this General Permit, the requirement to implement BMPs "to the extent feasible" requires Dischargers to select, design, install and implement BMPs that reduce or prevent discharges of pollutants in their storm water discharge in a manner that reflects best industry practice considering technological availability and economic ***practicability and*** achievability.

[1] Federal MSGP page 12

Language Clarity Based on Above Definitions

Use of "eliminate" should be made consistent with the federal MSGP as follows.

Uses of Eliminate should have the qualifier "***to the extent achievable***" included after their usage at the following locations throughout the documents:

1. Fact Sheet, Page 21 – Second paragraph. After "eliminate" insert "***to the extent achievable***"
2. Fact Sheet Page 21 – Second Paragraph, last sentence. After "eliminate"-Insert "***to the extent achievable***"
3. Fact Sheet, Page 34 – after "eliminate" insert "**to the extent achievable.**"
4. Attachment C, Glossary – Good Housekeeping BMP's, after eliminate insert "***to the extent achievable."***

Conforming Effluent Limitation Language in V.A

CASQA has provided specific suggestions to address the similar language issue in the Effluent Limitation language in Section V.A, which we agree with. [Or: For the reasons cited above, and consistent with the MSGP, the language in Section V.A, Effluent Limitations, should be clearly linked to the SWPPP and BMP requirements in the Draft Permit, and should also refer to economic practicability.]

Specific Minimum BMP Language Suggestions

CASQA Comments

CASQA has provided specific suggestions to the minimum BMP language that we strongly support as necessary clarifications to the Draft. Specifically items 28, 29, 30, 31, 32, 33 and 34.

What occurs when minimum BMP's are infeasible

We note that the Fact Sheet, while recognizing minimum BMP's may not be appropriate in all instances, does little to nothing to describe such scenarios nor the expected actions of the permittee when it occurs. The Draft does not make it clear that where facilities find it infeasible to implement minimum BMP's they are still expected to address stormwater discharge from the activity process via alternative BMP's. In multiple sections of the Fact Sheet the following linkages between minimum and advanced BMP's are noted which imply a minimum BMP "AND" potential advanced BMP requirement, but none which recognize that where Minimum BMP's are infeasible it is an "and/or" relationship.

Page 4 of Fact Sheet, Proposed Addition

1. Minimum Best Management Practices (BMPs)
This General Permit requires Dischargers to implement a set of minimum BMPs. The minimum BMPs, in combination with any advanced BMPs (collectively, BMPs) necessary to reduce or prevent pollutants in industrial storm water discharges, serve as the basis for compliance with this General Permit's technology-based effluent limitations. Although there is great variation in industrial activities and pollutant sources between industrial sectors and, in some cases between operations within the same industrial sector, the minimum BMPs specified in this General Permit represent common practices that can be implemented by most facilities. ***Where a minimum BMP is infeasible the SWPPP shall include a discussion of the advanced and/or alternative BMP's utilized to manage stormwater for that activity.***

Page 20 of Fact Sheet, Proposed Addition

2. Minimum and Advanced BMPs
Section V of this General Permit requires the Discharger to comply with technology-based effluent limitations. In this General Permit, those limitations take the form of BMPs which Dischargers must implement to prevent and reduce the presence of pollutants in their discharge. The BMP effluent limitations have been integrated into the Section X.H of this General Permit and are divided into two categories – minimum BMPs which are generally non-structural BMPs that all Dischargers must implement to the extent feasible, and advanced BMPs which are generally structural BMPs that must be implemented to the extent feasible if the minimum BMPs are inadequate **or infeasible**. Section X of this General Permit includes both substantive control requirements in the form of the BMPs listed in Section X.H, as well as various reporting and recordkeeping requirements. The requirement to implement BMPs "to the extent feasible" allows Dischargers flexibility when implementing BMPs, by not requiring the implementation of BMPs that are not technologically available or economically achievable in light of best industry practices. ***There is general recognition within stormwater regulation that the covering of large stockpiles is infeasible. This is reflected both within the MSGP in providing mineral facilities with an inactive mine provision which does not require no exposure status as well as within the BMP handbooks of other jurisdictions such as Washington State which notes, "For large uncovered stockpiles implement containment practices at the perimeter of the site and at any catch basins as needed to prevent erosion and discharge of the stockpiled material off-site or to a storm drain.***

Ensure that no direct discharge of contaminated stormwater to catch basins exists without conveying runoff through an appropriate treatment BMP."[2] And provides further clarity as follows "Applicable Treatment BMP: Convey contaminated stormwater from the stockpile area to a wet pond, wet vault, settling basin, media filter, or other appropriate treatment system depending on the contamination." Facilities not implementing a minimum BMP for feasibility reasons need to include a description of the alternative BMP's implemented.

In our previous comments submitted on previous drafts we have detailed the impracticability of covering stockpiles of readily mobilized materials which may exist at mineral operations and associated industrial facilities. Please refer to the Comments of CalCIMA from April 29, 2011, Page 13 and the attached Mine Safety and Health Administration pamphlet on stockpile safety.

Clarification of Understanding of "Readily Mobilized."

In several places the term "readily mobilized" is used within the document. While we are sympathetic of the need to provide some flexibility to the interpretation of that term, considering the number of industries regulated under this Draft, we believe it would be beneficial to provide some additional clarity to the term's usage. It is clear from the Draft and associated documents that a soluble material such as rock salt is readily mobilized. From our discussions with staff we understand that it is intended to describe industrial materials such as powders or liquids that are mobilized by contact with stormwater. If our understanding is correct, materials such as a non-revegetated topsoil stockpile or fertilizer storage pile for reclamation would represent readily mobilized materials. However, a storage pile of rock may not. Is this understanding correct?

Section X.H.4 – Redundant Sections

Section X.H.4 includes details of multiple descriptions required in the SWPPP which are redundant to other components and/or unnecessary or misplaced. Keeping these items within this section is likely to lead to unnecessary changes to the SWPPP throughout the year. These items are as follows;

1. "The pollutant(s) that the BMP is designed to reduce or prevent in industrial storm water discharges" (X.H.4.a.i) –
    a. *Found in BMP Handbook*

[2] "Stormwater Management Manual for Western Washington", *Volume IV - Source Control BMPs 2012* Department of Ecology, State of Washington, P 2-56

2. The frequency, time(s) of day, or conditions when the BMP is scheduled for implementation" (X.H.4.a.ii) –
    a. Varies significantly based on sample results and activities at a site. Seems to force discharger to update SWPPP whenever scenarios not anticipated during initial SWPPP drafting result in changing processes on the ground.
3. "The locations within each area of industrial activity or industrial pollutant source where the BMP shall be implemented" (X.H.4.a.iii) –
    a. Found in BMP Summary Table and on Site Map
4. "The procedures, including maintenance procedures, and/or instructions to implement the BMP effectively" (X.H.4.a.v) –
    a. Found in BMP Handbook
5. "The equipment and tools necessary to implement the BMP effectively" (X.H.4.a.vi) –
    a. Found in BMP Handbook
6. The BMPs that may require more frequent visual observations beyond monthly visual observations as described in Section XI.A.1" (X.H.4.a.vii) –
    a. First, Section XI.A.1 does not currently include a requirement to discuss areas which may need more frequent visual observations.
    b. Second, such a discussion more appropriately belongs in Section X.I (Monitoring Implementation Plan). As the Monitoring Implementation Plan is the document facilities will use to coordinate their visual observation and sampling activities.
    c. The language in (X.H.4.a.vi) should be deleted from that section and moved to an appropriate location in X.I (Monitoring Implementation Plan)

Effective Date: Please Change to July 1, 2015:

We appreciate that the Draft permit has selected an effective date that is at least 12 months after the Drafts expected adoption. We recognize that both the Board and permitted industry will need to adapt to the Draft and at least this much time with the final adopted permit will be necessary. However, implementing the Draft permit in the middle of the storm year creates significant functional challenges.

Mineral operations are complex facilities and the Draft adds significant duties and changes to how operators will administrate and manage their programs. Implementing within a storm year creates the functional challenge of necessitating a switch in processes and employee training mid-stream. Operations could literally go from sampling a storm event on December 31st under the 1997 Permit to Sampling under the

new permit program and MIP on January 1st. The employees would need to be trained to two different systems. It also raises technical questions.

How will SMARTS handle dual reporting come July 2015? Will double the volume of reports create an electronic bottleneck? Or when the Draft supercedes the previous Permit does the annual reporting mandate for the previous Permit also cease?

We are very cognizant that this Draft and a new permit have been under debate for a long time. We do not believe this justifies a rushed implementation in the middle of a storm year instead of enabling a transition during the generally dry summer months. The goal should be promoting the effective implementation of the new system. As a result we believe the effective date should be changed to July 1, 2015.

What is a Violation?

The Fact Sheet includes Figure 3 on page 44, which is a compliance flowchart. We would like to note this flow chart appears to be incomplete. The specific issue within the flow chart is it does not account for several factors which may result in a facility not having two sampled storm events per half year.

The specific events within the permit which may result in not having two sampled Qualifying Storm Events each half year are as follows;

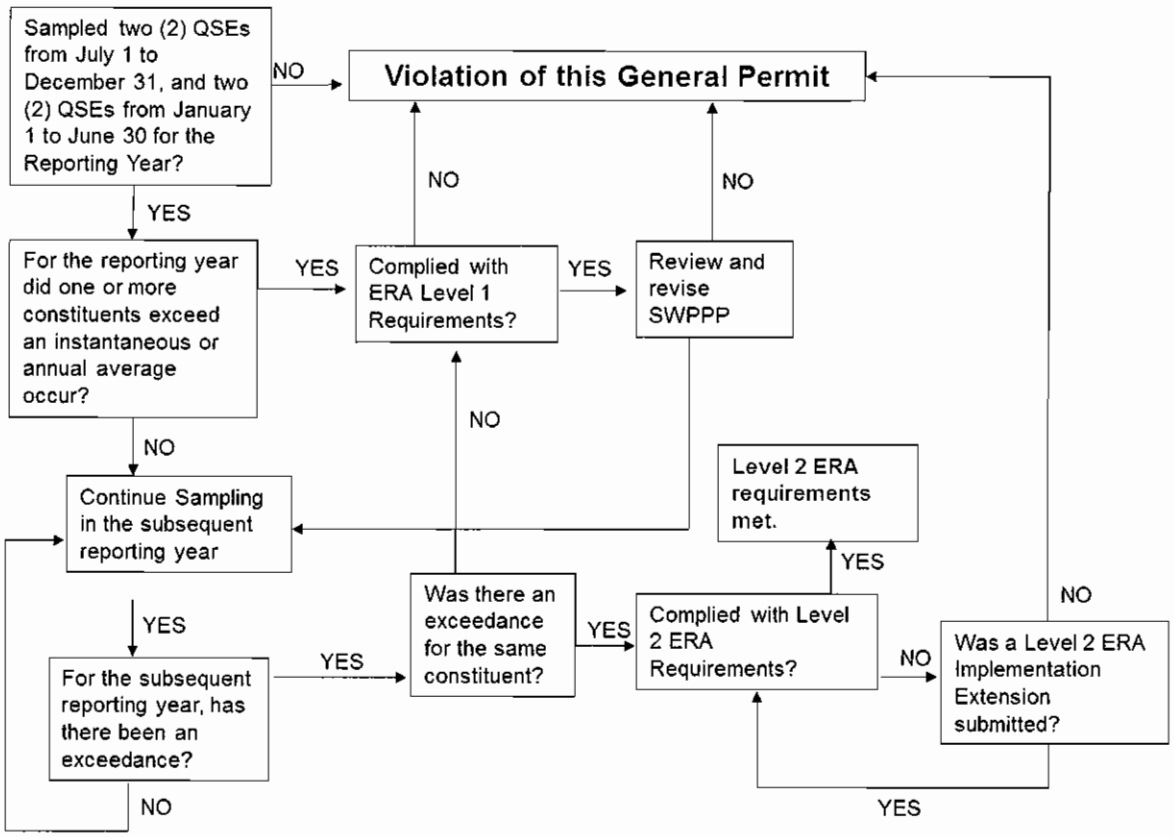
1. There were not two qualifying events to sample
    a. Discharges simply did not occur at the facility from any rain events that may or may not have occurred.
2. Sampling of a discharge was not conducted due to the safety dangerous weather exception XI.C.6.a.1.
3. Sampling of a discharge was not conducted due to the Outside of Scheduled Facility Operating Hours Exception. XI.C.6.a.2
4. Facility was part of a Group
5. Facility was subject to a Sampling Frequency Reduction

We have inserted a copy of the Figure below for ease of reference. We have also identified where we believe the confusion in the Figure came from within the Draft.

XI.B.2 states;

> "The Discharger shall collect and analyze storm water samples from two (2) QSEs within the first half of each reporting year (July 1 to December 31), and two (2) QSEs within the second half of each reporting year (January 1 to June 30). "

We believe this section taken in isolation from the exceptions and sampling frequency reductions sections of the Draft is likely the cause of the lack of clarity in Figure 3 below.



We believe the compliance flowchart should be updated with the appropriate questions regarding whether QSE's occurred as well as if they were not sampled as a result of the exceptions included within the Draft. An alternate solution would be to remove the figure entirely.

Qualifying Storm Event Clarity:

We are appreciative of the changes that have been made to the definition of a Qualifying Storm Event. However, as we have reviewed it multiple reviewers have translated it in a way which would clearly contradict how staff has told us they intend it to read as well as the goal of increasing the likelihood of sampling discharges.

The language in the Draft currently reads:

1. A Qualifying Storm Event (QSE) is a precipitation event that:
   a. Produces a discharge for at least one drainage area; and

b. Preceded by 48 hours with no discharge from any drainage area.

Our review of this language considers the nature of mineral operations, which are often large facilities with a very large percentage area of pervious surfaces and much smaller sections impervious surfaces. As a result when a system of storms comes through while discharges may occur from the impervious areas earlier in such a system, the pervious drainages at a facility may not discharge until later in the week under a different precipitation event. This language would therefore appear to prevent us from sampling discharges from the pervious areas of a facility when a storm system came through on a Monday causing a discharge from drainage 1. Monday night that event passed discharge ceased and the following Wednesday another event came through causing discharges at points 2 and 3. Under the draft definition we would seem to be precluded from taking samples at discharge points 2 and 3 due to the language in 1.b.

We believe it would be best if the language was changed as follows;

1. A Qualifying Storm Event (QSE) is a precipitation event that:
a. Produces a discharge for at least one drainage area; and
b. Preceded by 48 hours with no discharge from ~~any~~ ***that*** drainage area.

We believe this change will promote the goal of helping to ensure samples are collected from all drainages at a facility and that those facilities such as mineral operations with multiple discharge points are likely to be able to sample them.

Mining Specific Definitions Included in Federal MSGP:

The federal MSGP has provided clarity on an issue that has occasionally been discussed in California. As the SIC code for mining operations are specifically listed for inclusion within the Industrial Stormwater Permit, we believe translating these definitions into the Fact Sheet is important to ensuring mines maintain adequate SWPPP's throughout their life. Specifically the federal MSGP has provided definitions for Active phase, Construction phase, Reclamation phase, Exploration phase, etc. The MSGP also clarifies that discharges from all phases of a mineral operation are covered under this permit, including construction and reclamation. Making sure it is clear mineral operations comply with this Draft for their entire facility duration is appropriate and these federal definitions and clarifications do that.

These definitions add important clarity for our industry and it would be beneficial to include them in Attachment A.

The relevant MSGP Mining Specific Definitions and Coverage's read as follows [3]:

[3] Federal MSGP, Sector J Pages 79 and 80

8.J.1 Covered Stormwater Discharges.

The requirements in Subpart J apply to stormwater discharges associated with industrial activity from Active and Inactive Non-Metallic Mineral Mining and Dressing facilities as identified by the SIC Codes specified under Sector J in Table D-1 of Appendix D of the permit.

8.J.1.1 *Covered Discharges from Inactive Facilities.* All stormwater discharges.

8.J.1.2 *Covered Discharges from Active and Temporarily Inactive Facilities.* All stormwater discharges, except for most stormwater discharges subject to the existing effluent limitation guideline at 40 CFR Part 436. Mine dewatering discharges composed entirely of stormwater or uncontaminated ground water seepage from: construction sand and gravel, industrial sand, and crushed stone mining facilities in Regions 1, 2, 3, 6, 9, and 10 are covered by this permit.

8.J.1.3 *Covered Discharges from Exploration and Construction of Non-Metallic Mineral Mining Facilities.* All stormwater discharges.

8.J.1.4 Covered Discharges from Sites Undergoing Reclamation. All stormwater discharges.

8.J.3.1 *Mining operations* - Consists of the active and temporarily inactive phases, and the reclamation phase, but excludes the exploration and construction phases.

8.J.3.2 *Exploration phase* - Entails exploration and land disturbance activities to determine the financial viability of a site. The exploration phase is not considered part of "mining operations."

8.J.3.3 *Construction phase* - Includes the building of site access roads and removal of overburden and waste rock to expose mineable minerals. The construction phase is not considered part of "mining operations".

8.J.3.4 *Active phase* - Activities including the extraction, removal or recovery of minerals. For surface mines, this definition does not include any land where grading has returned the earth to a desired contour and reclamation has begun. This definition is derived from the definition of "active mining area" found at 40 CFR 440.132(a). The active phase is considered part of "mining operations."

8.J.3.5 *Reclamation phase* - Activities undertaken, in compliance with applicable mined land reclamation requirements, following the cessation of the "active phase", intended to return the land to an appropriate post-mining land use. The reclamation phase is considered part of "mining operations".

NOTE: The following definitions are not intended to supersede the definitions of active and inactive mining facilities established by 40 CFR 122.26(b)(14)(iii).

8.J.3.6 *Active Mineral Mining Facility* - A place where work or other activity related to the extraction, removal, or recovery of minerals is being conducted. For surface mines, this definition does not include any land where grading has returned the earth to a desired contour and reclamation has begun. This definition is derived from the definition of "active mining area" found at 40 CFR 440.132(a).

8.J.3.7 *Inactive Mineral Mining Facility* - A site or portion of a site where mineral mining and/or milling occurred in the past but is not an active facility as defined above, and where the inactive portion is not covered by an active mining permit issued by the applicable State or Federal agency. An inactive mineral mining facility has an identifiable owner/operator. Sites where mining claims are being maintained prior to disturbances associated with the extraction, beneficiation, or processing of mined materials, and sites where minimal activities are undertaken for the sole purpose of maintaining a mining claim are not considered either active or inactive mining facilities and do not require an NPDES industrial stormwater permit.

8.J.3.8 *Temporarily Inactive Mineral Mining Facility* - A site or portion of a site where metal mining and/or milling occurred in the past but currently are not being actively undertaken, and the facility is covered by an active mining permit issued by the applicable State or Federal agency.

Exceedance Response Actions

As Soon as Practicable

CalCIMA believes this language should be deleted from the Draft as follows. The language itself is impossible to define and seems to only create a potential point of disagreement and conflict. As there is already language which sets a no later than point of time, we believe that standard is more appropriate.

1. (Section XII.C.2.a) "*Based upon the above evaluation, the Discharger shall, ~~as soon as practicable but~~ no later than January 1 of the subsequent reporting year:"*
2. (Section XII.D.1.c) "*All elements of the Level 2 ERA Action Plan shall be implemented ~~as soon as practicable~~ and completed no later than 1 year after submitting the Level 2 ERA Action Plan.*

Level 1 ERA – Evaluating All Drainage Areas (XII.C.1)

The requirement that "ALL" drainage areas should be evaluated should be removed from this section. Mine sites can be extremely large and diverse in activity and therefore pollutants being managed in drainages. Facilities that are hundreds of acres

should not need to waste effort evaluating parts of the facility where an issue has not occurred but instead focus on the area where it did. Please modify the language as follows;

1. Within 60 days of entering Level 1 status, the Discharger shall complete an evaluation of the industrial pollutant sources at the facility that are or may be related to the NAL exceedance(s) and the corresponding BMPs and implementation measures in the SWPPP. The evaluation shall identify any additional BMPs and SWPPP revisions necessary to prevent or reduce future NAL exceedances and to comply with the requirements of this General Permit. ~~Although~~ The evaluation ~~may~~ ***Shall*** focus on the drainage areas where the NAL exceedance(s) occurred~~, all drainage areas shall be evaluated~~.

Level 2 Status Clarity

This section of our comments addresses inconsistencies between the language in the Fact Sheet regarding Discharger obligations under ERA Level 2 status and the language within the Draft. There is also some opportunity even within the Fact Sheet to interpret the language differently. The general summary is that the Fact Sheet language states a Dischargers level 2 obligations are met upon submittal of the Level 2 technical report and they are subject to no further Exceedance Response Actions (ERA's) unless directed by a Regional Board. The Draft on the other hand states Dischargers are obligated to submit a new technical report each year. Our understanding is the intent of changes within the Draft language is to indeed require some reevaluation of technical report sufficiency, however we disagree that annual review of a full technical report is desirable or needed. Indeed we believe that a more reasonable approach would be at most a three year reanalysis/update of those technical reports unless otherwise directed by a Regional Board. This standard is consistent with the federal requirement that inactive mines have their plans recertified by an engineer every 3 years. (CFR 122.44.i.4.iv). We believe it would be fully appropriate to have the Technical report certified every three years by the QISP unless otherwise requested by the Regional Board. We would note that other sections of the permit which require revisions to the SWPPP for substantial changes provide Regional Boards with the information necessary to determine if they feel significant enough changes have occurred at a facility to warrant such a request.

We also appreciate that the Draft has created a process by which Dischargers can immediately enter level 2 status and submit the required technical report that demonstrates they will be unable to meet the applicable NAL for the specified reasons. There are strong doubts within some in the permitted community that the NALs will be achievable considering the geologic setting and weather patterns of their facilities. And while the overall NAL process is beneficial in providing the clarity that such exceedances are not violations. A continual reanalysis of the same factors annually is not perceived as beneficial. As such clarity that the process is both an update and not required annually is requested.

Below you will find the relevant section of federal regulation we mentioned as well as various Fact Sheet and Draft citations which when reviewed in total reveal the inconsistencies within the current draft.

> CFR 122.44.i.4.iv;
> "*Permits for storm water discharges associated with industrial activity from inactive mining operations may, where annual inspections are impracticable, require certification once every three years by a Registered Professional Engineer that the facility is in compliance with the permit, or alternative requirements.*"

Fact Sheet Section K.5, Pg. 57 provides the following;

> "*Level 2 ERAs are required during **any** subsequent reporting year in which the same parameter(s) has an NAL exceedance (annual average or instantaneous maximum).....*"

Could be read to imply a level 2 report in any subsequent reporting year with a NAL exceedance. The result of some Level 2 reports is expected to be that such exceedances will continue.

Fact Sheet Section K.5.b.i, Pg. 58 provides;

> "....Dischargers who submit an Industrial Activity BMPs Demonstration but have or will not install additional BMPs that are not expected to eliminate future NAL exceedance(s) will remain with Level 2 status **but are not subject to any additional ERAs unless directed by the Regional Water Board.**" And,

Fact Sheet Section K.5.b.ii, Pg. 59 provides;

> "....Dischargers that submit this type of demonstration remain with Level 2 status **but are not subject to any additional ERAs unless directed by the Regional Water Board.**" And,

Fact Sheet Section K.5.b.iii, Pg. 60 provides;

> "...Dischargers that submit this type of demonstration will remain with Level 2 status **but are not subject to any additional ERAs unless directed by the Regional Water Board**."

Fact Sheet Section D.6, Pg.6 provides;

> "....The second time an annual NAL or instantaneous maximum NAL exceedance occurs for the same parameter in **each** subsequent reporting year, the Discharger's status is changed to Level 2 status, and **Dischargers are required to submit a Level 2 ERA Action Plan and a Level 2 ERA Technical Report**. Dischargers who can demonstrate that:"

Could be read to imply every NAL exceedance after the first is a trigger to conducting a Technical Report. "Each" should be replaced with "a".

Fact Sheet Section D.6.c, Pg. 6 provides;

> Unless not accepted by the State or Regional Water Board, **the Discharger is excused from the obligation to perform additional ERA** requirements for the parameter(s) involved." However,

Order Section XII.D.3.c, Pg. 51 provides;

> "Dischargers with Level 2 status who have submitted the Level 2 ERA Technical Report are required to **annually update** the Level 2 ERA Technical Report based upon facility operational changes, pollutant source(s) changes, and/or information that becomes available via compliance activities (monthly inspections, sampling results, annual evaluation, etc.). The Level 2 ERA Technical Report shall be certified and submitted via SMARTS with each Annual Report."

We would suggest that order Section XII.D.3 be revised as follows;

> "Dischargers with Level 2 status who have submitted the Level 2 ERA Technical Report are required to ~~**annually**~~ **update** the Level 2 ERA Technical Report ***every third year from entering level 2 status unless otherwise requested by the Regional Water Board*** based upon facility operational changes, pollutant source(s) changes, and/or information that becomes available via compliance activities (monthly inspections, sampling results, annual evaluation, etc.). The Level 2 ERA Technical Report **update** shall be certified and submitted via SMARTS with ~~each~~ ***the*** Annual Report ***every third year from entering Level 2 status for the parameter(s) included in the report***."

In addition corresponding changes need to be made to the Fact Sheet for consistency between the Draft and Fact Sheet language to reflect the final language of the Draft.

Authorized Non Stormwater Discharge Addition

The Draft properly lists several sources of water that may be present at industrial facilities and classifies them as authorized Non Stormwater Discharges (NSWD's). Recognizing that water is a predominant form of dust control at industrial facilities, particularly at mining operations where the watering of roads, misting of conveyor transfer points and drop points are often mandated by regulation. We believe that it is both appropriate and necessary to classify incidental water from dust control activities as an authorized NSWD under this permit in section IV.A.

303(d) Listed Water Body & New Discharger

In Section VII.B of the Draft requirements for impaired water bodies are discussed. We believe clarity needs to be added to this section in two areas. First that "impaired water bodies" are "303 (d) listed impaired water bodies" and second the meaning of "New Discharger" within the section.

CASQA's comments item 23 discuss "New Discharger" and we agree with their comments. We will simply add the use of this term within this section causes confusion because "New Dischargers" are defined in other sections of the Draft relating to those seeking permit coverage. The CASQA comments adequately reflect the confusion that can cause when it relates to this provision.

CASQA did not address adding clarity to the language that impaired water bodies be clarified as 303(d) listed. We would suggest the following language change to VII.B to address that issue.

> "New Dischargers applying for NOI coverage under this General Permit that will be discharging to a~~n~~ ***303(d) listed*** impaired water body are ineligible for coverage unless the Discharger submits data and/or information that:"

Effluent Limitation Guidelines Clarity

The General Permit Draft states that Dischargers with facilities subject to storm water ELGs (Effluent Limitation Guidelines) in 40 CFR Subchapter N shall collect and analyze samples for each regulated pollutant specified in Subchapter N. In Attachment F of the permit the specific categories are detailed including requirements for Mineral Mining and Processing. We would note that Part 436 for these operations lists pollutants and effluent limitations related to process generated waste water and "mine dewatering discharges".

CalCIMA believes clarity should be added to the Permit or Fact Sheet that only the effluent limitations relevant to stormwater discharges from those ELG guidelines apply. If the Permit is in fact authorizing the discharge of these non stormwater discharges, it should be clarified that those subparts apply to the extent such waters are discharged and not to stormwater discharged.

Consistency/Clarity

Reduce or Prevent Consistency

We appreciate the Board has clarified the meaning of Reduce or Prevent as it is used within the Draft in regards to BMP's. Specifically the Fact Sheet (Page 5) notes;

> "The TBELs in this General Permit require Dischargers to implement BMPs to reduce or prevent discharges of pollutants in their storm water discharge in a manner that reflects best industry practice considering technological availability and economic achievability (Section V.A.). **The requirement to "reduce or prevent" is equivalent** to the requirement in the federal regulations that BMPs be used in lieu of NELs to "control or abate" the discharge of pollutants. (40 C.F.R. § 122.44(k).) These limits were developed using Best Professional Judgment (BPJ)."

While we believe this clarity is beneficial at multiple points in the Fact Sheet in discussing BMP's the single term "prevent" is used instead. Alternately we find references to "prevent or reduce" and "prevent and reduce". In order to promote clarity as well as the proper application of this definition where intended we have compiled the following list of locations where "Prevent" or "Prevent or/and Reduce" appears to have been used instead of the clarified "Reduce or Prevent". We attempted to be thorough but may have missed a few.

Uses of "Prevent" or "Prevent or Reduce" which should be changed to "***Reduce or Prevent***"

1. **Fact Sheet Page 14**
    a. The General Permit requires Dischargers implement appropriate BMPs to **prevent or reduce** pollutants in storm water discharges during the facility closure.
2. **Fact Sheet Page 14**
    a. Section IV of this General Permit provides a limited list of NSWDs that are authorized if Dischargers implement BMPs to **prevent** contact with industrial materials prior to discharge.
3. **Fact Sheet Page 14**
    a. These have been omitted because the Discharger is responsible to **prevent or reduce** pollutants in storm water discharges from paved areas
4. **Fact Sheet Page 20**
    a. BMPs are defined as the "scheduling of activities, prohibitions of practices, maintenance procedures, and other management practices to **prevent or reduce** the discharge of pollutants...
5. **Fact Sheet Page 20**
    a. This General Permit requires all Dischargers to implement minimum BMPs, as well as implement any advanced BMPs that are necessary to reduce or prevent pollutants in discharges to the extent feasible when implementation of the minimum BMPs will not adequately **prevent or reduce** pollutants in discharges
6. **Fact Sheet Page 20**
    a. BMPs can be actions (including processes, procedures, schedules of activities, prohibitions on practices and other management practices), or structural or installed devices to **prevent or reduce** water pollution.
7. **Fact Sheet Page 30**

a. Section V of this General Permit requires the Discharger to comply with technology-based effluent limitations. In this General Permit, those limitations take the form of BMPs which Dischargers must implement to **prevent and reduce** the presence...

8. **Fact Sheet Page 33**
   a. This General Permit (Section X.H.1.f) requires the implementation of (5) BMPs to **prevent** erosion and sediment discharges. The erosion and sediment control BMPs include: implementing effective wind erosion controls,
9. **Fact Sheet Page 33**
   a. The erosion and sediment control BMPs include: implementing effective wind erosion controls, providing for effective stabilization of erodible areas prior to a forecasted storm event, site entrance stabilization/**prevent** material tracking offsite and implement perimeter controls
10. **Fact Sheet Page 35**
    a. Dust generation and vehicle tracking of industrial materials BMPs are included in Section X.H.1.b ("good housekeeping") of this General Permit where Dischargers must **prevent** dust generation from industrial materials or activities
11. **Fact Sheet, Page 44**
    a. "(3) evaluate and develop additional BMPs to **prevent and reduce** pollutants in the industrial storm water discharges.
12. **Fact Sheet Page 57**
    a. Dischargers may have to implement additional BMPs, which may include physical, structural, or mechanical devices or facilities that are intended to **prevent** pollutants from contacting storm water. Examples of such controls include, but are not limited to:
13. **Order, page 5**
    a. This General Permit requires control of pollutant discharges using BAT and BCT to **prevent and reduce** discharges of pollutants, and any more stringent effluent limitations necessary to meet applicable WQS.
14. **Order Page 9**

a. (b) evaluate whether measures to **prevent or reduce** industrial pollutant loads identified in the Discharger's SWPPP are adequate

15. **Order Page 20**
    a. **Prevent or reduce** the contact of authorized NSWDs with materials or equipment that are potential sources of pollutants
    b. **Prevent or reduce** discharges of pollutants in authorized NSWDs in a manner that reflects best industry practice considering technological availability and economic achievability

16. **Order Page 29**
    a. Based upon the assessment above, Dischargers shall identify in the SWPPP any areas of the facility where the minimum BMPs described in subsection H.1 below will not adequately **prevent or reduce** pollutants in storm water discharges in compliance with Section V.A. Dischargers shall identify any advanced BMPs, as described in subsection H.2 below, for those areas.

17. **Order Page 33**
    a. These include storm resistant shelters (either permanent or temporary) that **prevent** the contact of storm water with the identified industrial materials or area(s) of industrial activity.

18. **Attachment C Page 2**
    a. Scheduling of activities, prohibitions of practices, maintenance procedures, and other management practices to **prevent or reduce** the discharge of pollutants. BMPs also include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

19. **Attachment C Page 3**
    a. Vegetation, such as grasses and wildflowers, and other materials, such as straw, fiber, stabilizing emulsion, protective blankets, etc., placed to stabilize areas of disturbed soils, reduce loss of soil due to the action of water or wind, and **prevent** water pollution.

Inspection vs. Observation

One of the modifications to the draft which occurred in this last iteration was a consolidation of multiple inspections into monthly visual observations under XI.A. As a result as we read through the Fact Sheet, Draft and Appendix 1, we notice references

to inspection which no longer appear in the Draft and have been replaced by "visual observations". We have attempted to identify such areas below. Bold use of the word "**inspection(s)**" should be replaced with "***observation(s)***" or perhaps "***visual observation(s)***"

1.) **Fact Sheet Page 28**
   - **a.** "This General Permit requires that Dischargers select an appropriate facility **inspection** frequency beyond the required monthly **inspections** if necessary, and to determine if SWPPP revisions are necessary to address any physical or operational changes at the facility or make changes to the existing BMPs (Section X.H.4.a.vii and Section XI.A.4 of this General Permit). Facilities that are subject to multi-phased physical expansion or significant seasonal operational changes may require more frequent SWPPP updates and facility **inspections**. Facilities with very stable operations may require fewer SWPPP updates and facility **inspections**."
     - **i.** The referenced sections of the Draft now refer to the monthly observations and the SWPPP addressing BMP's which may require more than Monthly observations. The language in the Fact Sheet should strike the "inspection" and replace it with the appropriate "observations" reflected in the draft order.

2.) **Fact Sheet Page 5**
   - **a.** Dischargers are required to evaluate BMPs being implemented and determine an appropriate interval for the implementation or **inspection** of these BMPs.
     - **i.** Inspection should be "observations" based on Order (Section X.H.4.a.vii)

3.) **Fact Sheet Page 34**
   - **a.** "This General Permit (Section X.H.1.c) incorporates this concept by requiring four (4) nonstructural BMPs which include: identification and **inspection** of equipment, observations of potential leaks in identified equipment, an equipment maintenance schedule, and equipment maintenance procedures."
     - i. Inspection is no longer required under Section X.H.1.c, Monthly visual observations are required under the draft and, Section X.H.4.a.vii requires the SWPPP to identify the BMPs that may require more frequent visual observations beyond the monthly visual observations as described in Section XI.A.1.
       - **1.** Replacing the inspection on Fact Sheet page 34 identified above is recommended.

4.) **Appendix 1 Page 1**
   - a. BMPs that may have more frequent **inspections** (Section X.H.4.a.vii)
     - i. Cited Section is now "visual observations"

5.) Appendix 1 Page 5

- **a.** Review of all visual **inspection** and monitoring records and sampling and analysis results conducted during the previous reporting year (Section XV.1)
- **b.** This item references a review of what under the Draft would be the records associated with the monthly or more frequent visual observations. Currently (Section XV.1) does reference as written, however it is among the items being recommended for this consistency change
  - **i.** Change inspection in the use identified above to "observation"
- **c.** We would note that other uses of Visual Inspection on this same page reference a required visual inspection activity for the annual evaluation and do not need changing.

6.) Order Page 55

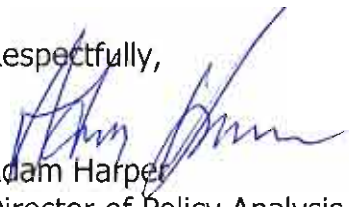
- **a.** Dischargers with Level 2 status who have submitted the Level 2 ERA Technical Report are required to annually update the Level 2 ERA Technical Report based upon facility operational changes, pollutant source(s) changes, and/or information that becomes available via compliance activities (monthly **inspections**, sampling results, annual evaluation, etc.). The Level 2 ERA Technical Report shall be certified and submitted via SMARTS with each Annual Report.
  - i. Should be observations unless we missed a level 2 specific inspection requirement.

7.) Order Page 56

- **a.** A review of all visual **inspection** and monitoring records and sampling and analysis results conducted during the previous reporting year;
  - **i. Inspection should be observation**

We appreciate the opportunity to comment on the Draft. It has undergone significant improvement however items of clarity and consistency need to be paid special attention to as it nears final adoption. Should you have any questions regarding our comments do not hesitate to contact us at (916) 554-1000 Ext. 102.

Respectfully,



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Director of Policy Analysis

Stockpiling Safety

U.S. Department of Labor
Mine Safety and Health Administration
National Mine Health and Safety Academy

Safety Manual Series
SM 27

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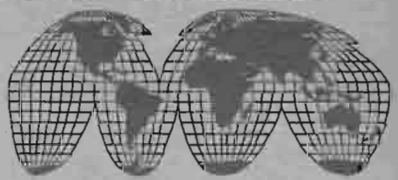

Stockpiling Safety

U.S. Department of Labor
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Safety Manual Series
SM 27

Revised 2001

PREFACE

This is one of a series of manuals prepared by the Mine Safety and Health Administration (MSHA) to acquaint the reader with a specific area of mining. This manual deals with the safe operation of mobile equipment on and around stockpiles. It discusses the hazards associated with stockpiles and reviews the procedures that can be used to minimize the occurrence of accidents.

Other manuals available in this series are listed on the inside back cover. Multiple copies may be ordered for $2.00 each. Single copies of safety manuals may be obtained free of charge from:

National Mine Health and Safety Academy
1301 Airport Road
Beaver, WV 25813-9426
Phone: 304-256-3257

You may fax an order at 304-256-3368.

Contents

Contents

Introduction

Stockpiles provide temporary storage for material awaiting shipping or processing. They are constantly changing in size and shape depending upon production levels or shipping schedules, and often involve a great deal of equipment activity. Mobile equipment involved in stockpiling activities include haulage trucks, front-end loaders, dozers, scrapers, an occasional maintenance vehicle, and a supervisor's pickup. Highway trucks and other non-mining vehicles can also be found near stockpiles contributing to the congestion. All of these vehicles, whether mining or private, are subject to hazards associated with stockpiling operations.

Stockpiles are designed for temporary storage and ease of material flowability, and often exhibit only marginal strength. When the heights of the piles, their continually changing shape, and the amount of vehicle activity are considered, it is easy to understand why stockpile accidents occur and why they are so prevalent within the mining industry.

The safe operation of mobile equipment on and around stockpiles can only be accomplished when equipment operators and their supervisors are aware of the potential hazards. This manual discusses the hazards associated with stockpiles and reviews the procedures that can be used to minimize accidents.

Mobile Equipment Accidents

A mobile equipment operator has a greater chance of being injured in an accident than the average surface miner. This can be attributed to the size, speed, and complexity of mobile equipment and the ever- changing mine environment. The mine environment is continually changing due to the natural progression of the production areas and the effects of the weather.

Mobile equipment accidents are more severe than the average surface mining accident.

In addition, many of the older mining operations, which were originally designed for small equipment, have updated to larger equipment without corresponding changes in mine layout and facilities.

THE SAFE OPERATION OF MOBILE EQUIPMENT IS EXTREMELY DEPENDENT UPON THE CAPABILITIES OF THE EQUIPMENT OPERATOR. The equipment operator's ability to correctly identify and quickly react to a potential hazard is more critical than for most mining tasks. The dynamic nature of the job provides more opportunity for a hazardous situation to develop, and a serious injury to occur.

IT IS VERY IMPORTANT TO BE TRAINED ON EACH PIECE OF EQUIPMENT BEING OPERATED. Controls will vary on different pieces of equipment. The controls may be located in different positions or they may operate differently. This can lead to momentary confusion and incorrect reactions when operating an unfamiliar piece of equipment. Successfully avoiding an accident often depends on the operator making the correct split-second decision.

Seat Belts

The chance of surviving an accident is greater when a seat belt is worn. In fact, the safest place to be during an accident is in the cab with a seat belt fastened. Nearly one-half of all mobile mining equipment fatalities occur to operators who are not wearing seat belts, or who take them off in a futile attempt to jump clear of the equipment. Staying with the machine is almost always better than attempting to jump out. A number of needless fatalities can be prevented by the simple act of wearing a seat belt and remaining within the cab.

Federal regulations mandate (with a few exceptions) that seat belts be provided on dozers, scrapers, front-end loaders, haulage trucks, etc., and that they be maintained in working condition. More importantly, the regulations state that they must be worn.

Seat belts save lives.

Stockpile Accidents

Stockpiles by their nature have a high amount of vehicle activity. This activity occurs at the top of the pile where dumping takes place and at the toe of the pile where loading takes place. Stockpile accidents usually involve haulage trucks, front-end loaders, and dozers, but highway trucks, utility trucks, scrapers, and pedestrians can also be involved. (The construction of stockpiles with conveyors is also widely practiced, presenting a unique set of hazards. However, a discussion of these hazards is not within the scope of this manual.)

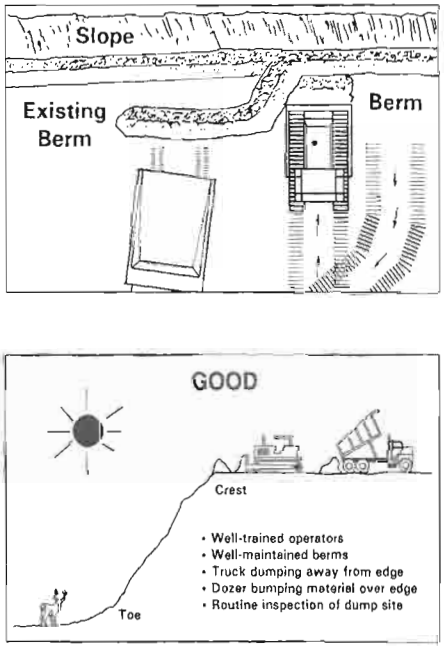
Stockpile accidents occur in all of the mineral industries including coal, metal, nonmetal, crushed stone, and sand and gravel. The accidents occur on stockpiles of mine run rock (blasted stone), screened stone, waste rock, fines, and sand and gravel. The same types of accidents also occur during the dumping of overburden, which is normally associated with permanent to semi-permanent structures such as waste dumps and spoil piles.

Stockpiling Techniques

Stockpiling techniques vary depending upon the size of the mine, the type of material handled, and type of equipment available. Some techniques are safer than others and should be used when applicable.

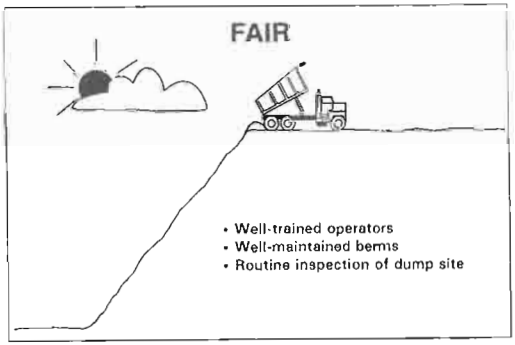
A "Good" Method of Stockpiling. A "good" method of stockpiling involves the haulage truck dumping its load

back from the crest of the pile. The material is then bumped over the edge by a dozer or front-end loader using other material. This method allows for the easy construction and maintenance of berms. This method also keeps mobile equipment away from the edge of the pile where the equipment has the highest chance of being involved in an accident. When combined with well-trained operators and routine inspections for signs of slope instability, this method drastically reduces the chance for an accident.



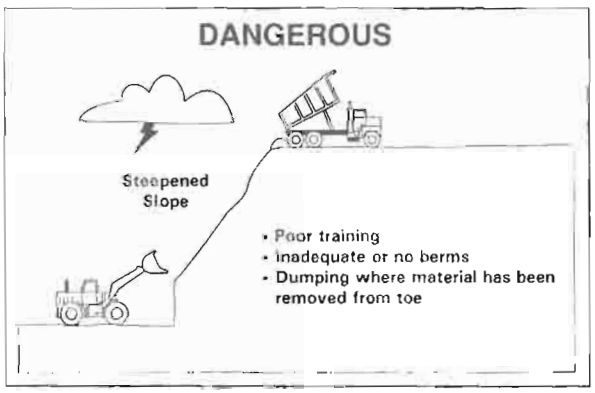
"Good" stockpiling method (top and side view).

A "Fair" Method of Stockpiling. A "fair" method of stockpiling involves the haulage truck dumping its load directly over the crest of the pile. For this method to be performed safely, adequate berms must be maintained and the equipment operators well trained regarding stockpile hazards. Other factors including the type of material, condition of the material, weather, and type and size of haulage truck need to be considered. It is also important to routinely inspect the dump area for signs of slope instability. When using this method it is important to ensure that material is not removed from the toe of the pile where dumping is taking place.



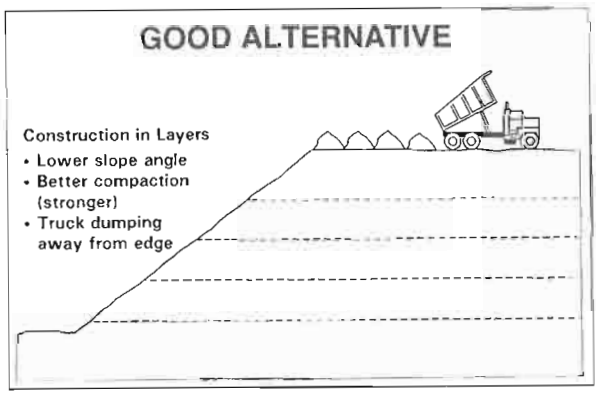
"Fair" stockpiling method (side view).

A "Dangerous" Method of Stockpiling. A "dangerous" method of stockpiling involves the haulage truck dumping its load directly over the crest of a pile where material has been removed from the toe. Removing material from the base of a pile generally results in a steepened slope. A steepened slope is less stable and cannot support as much weight. This creates a hazard for equipment operating near the crest of the pile, which is in danger of being involved in a slope failure. The mine supervisor, loader operator, and haulage truck driver must ensure that dumping does not occur where the slope has been steepened by reclaiming activities. The practice of dumping over the edge of a stockpile, in an area where the slope has been loaded out at the toe, should be prohibited.



"Dangerous" stockpiling method (side view).

Good "Alternative" Method of Stockpiling. A very good "alternative" method of stockpiling involves the construction of stockpiles in layers. In this method, haulage trucks dump their loads as piles on a single level. After a level is complete it is then smoothed over by a dozer and dumping continues on the next layer. The operation of the mobile equipment compacting the previous layer results in greater pile strength. The method also permits the slope angle to be maintained lower than the angle of repose, resulting in greater slope stability. Haulage trucks are also kept away from the edge of the pile. From a quality control standpoint, this method also avoids undesirable size separation of material.

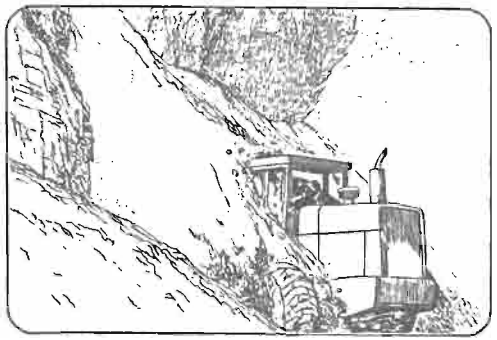


Good "alternative" method of stockpiling.

Loading Out at the Toe

"Loading out at the toe" refers to removal of material from the base or toe of the stockpile. This is usually done by front-end loaders. The material is loaded into trucks for shipping or is fed directly into crushers or feeders for further processing.

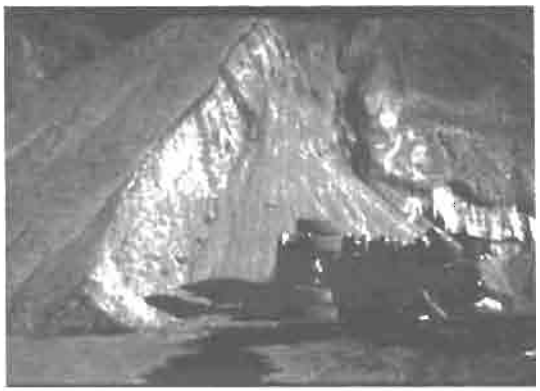
This method often results in a steepened slope with reduced stability. This presents a hazard to the loader operator at the base of the pile who needs to continuously watch for collapse of the steepened face.



Use extra caution when material is being removed from the base of a pile.

Equipment operators and others at the top edge of the pile are also in danger of being involved in slope failure. The weight of a haulage truck, in particular, can cause a weakened slope to fail. When this happens, the truck often falls down the slope with disastrous results. Loading out at the toe also presents a hazard to pedestrians at the base of the pile, particularly highway truck drivers, who may be engulfed by falling material while walking between their truck and the pile.

THE PRESENCE OF A BERM DOES NOT NECESSARILY SIGNIFY THAT IT IS SAFE TO DUMP. Loading out at the toe can result in slopes so weakened that the slope, including the berm, will fail when a truck backs up to dump. Berms in these instances give a false sense of security to the haulage truck operator who assumes the berm signifies a stable slope. Removing material from the base of the pile can also result in the collapse of the berm. This can allow haulage truck drivers to simply back over the edge of a pile when, unexpectedly, a berm is no longer there.



Dumping on top of a pile that has been loaded out at the toe can result in disaster.

When loading out at the toe:

- The loader operator should be alert to material sloughing down the pile, and the fall of frozen or consolidated chunks.
- The loader operator should ensure that haulage trucks don't dump at the top of a pile where the toe has been removed.
- Highway truck drivers should not walk around the base of the pile or between equipment and the pile.
- Haulage truck drivers should routinely observe the base of the pile where they are dumping to ensure the pile has not been oversteepened by the removal of material.
- Haulage truck drivers should dump only in a designated area that has been prepared by the construction of berms, and after a supervisory inspection for signs of slope instability.
- When the slope is oversteepened, the haulage truck should dump a safe distance from the crest. The material can then be bumped over the edge by a dozer or front-end loader, using other material.
- When the slope is oversteepened, the haulage truck can also dump at the base of the pile, adjacent to where the loader is operating.
- If the pile is oversteepened, then dumping over the crest should not be allowed until: material bumped over the crest of the pile reaches its original shape; berms are constructed; and an inspection for slope stability is completed.

Slope Instability

Stockpiles by their nature are only marginally stable. As material is dumped over the edge of a pile it slides down the slope coming to rest at the angle of repose. At the angle of repose the pile is just strong enough to support its own weight. The strength of the stockpile will often increase a certain amount from the compaction and vibration of mobile equipment operating on it. (This may be apparent by the steeper slopes formed when material is removed from the base of the pile.) This additional strength can be misleading, however, as an oversteepened slope may not support the weight of mobile equipment.

Moisture within the stockpile will also allow the slope to stand at a steeper angle. This indication of increased slope strength is known as "apparent cohesion." This strength may disappear quickly with an increase or decrease in moisture levels. Apparent cohesion is also vulnerable to collapse induced by equipment vibration. Freezing can also result in a temporary increase in strength. This increase in strength is highly variable and can quickly disappear with a change in the weather. In general, moisture or freezing will give a temporary indication of strength that cannot be relied upon.

DUE TO THE MARGINAL STRENGTH OF STOCKPILES, IT IS IMPORTANT TO STAY ALERT TO ANY SIGNS OF SLOPE INSTABILITY. If one of the following warning signs appears, the slope edge may not be safe for equipment operation: 1) cracks along the crest, 2) slumping on the slope, or 3) bulging at the toe.

Cracks Along the Crest

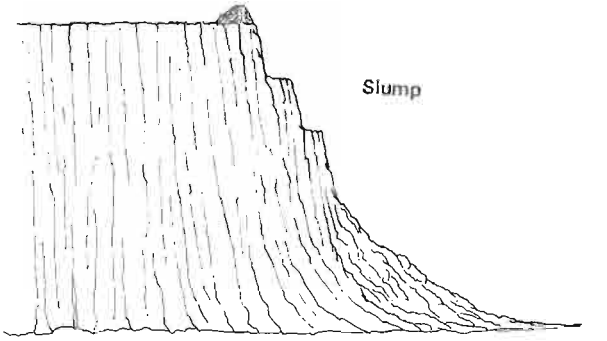
Cracks along the edge of a slope signify that the slope is having trouble supporting its own weight. The additional weight of mobile equipment would likely be sufficient to cause a slope failure. **WHEN CRACKS ARE OBSERVED THE AREA SHOULD BE MARKED OFF BY A BERM OR CONES UNTIL THE CONDITION IS CORRECTED.** A crack is an important warning sign and shouldn't be covered up. Dumping can continue at a safe distance from the cracks with the material being bumped over the edge, preferably by a tracked dozer. The dozer should not operate past the cracks.

Cracks along crest of pile.

If the weakened slope resulted from loading out at the toe, then material should be bumped over the edge until the slope is at the original angle of repose. Pushing material over the edge until the original angle of repose is achieved should strengthen the pile sufficiently to permit further end dumping over the edge. Dumping material at the base of the pile will add additional strength. If slope stability is still uncertain, dumping should continue at the base of the pile rather than at the top edge.

Slumping on the Slope

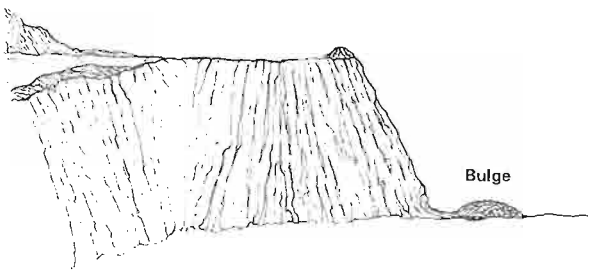
Slumping on the face of a pile is evidence that the slope cannot support its own weight and is failing. It normally occurs on waste dumps consisting of overburden and results when the slope angle near the top of the pile is too steep (often caused by the tendency of the waste, particularly the fines, to temporarily hang up near the top). When slumping is observed, end dumping over the edge should be stopped. Haulage trucks should dump their load a safe distance back from the slope edge, and dozers should be used to push the material over the crest.



Slumping along face of pile.

Bulging at the Toe

Bulging at the base of a pile is evidence that the foundation cannot support the weight of the pile. This is rare and usually occurs on large, relatively high, waste dumps. Movement of the material is usually very slow. Bulging can indicate the potential for a slope failure that might involve material movement up to and including the crest of the pile. When a bulge is observed near the base of a pile, dumping operations should be closely monitored, frequent inspections performed for signs of an impending failure (cracks at the top of pile, etc.), and a slope stability evaluation completed.



Bulging at the toe.

Signs of slope instability may be difficult to see when operating mobile equipment. For this reason a supervisory inspection on foot should supplement the equipment operator's constant vigilance. In general, MSHA regulations state that:

30 CFR 56/57.9304 Unstable ground.

(a) Dumping locations shall be visually inspected prior to work commencing and as ground conditions warrant.

(b) Where there is evidence that the ground at a dumping location may fail to support the mobile equipment, loads shall be dumped a safe distance back from the edge of the unstable area of the bank.

30 CFR 77.1713 Daily inspection of surface coal mine; certified person; reports of inspection.

(a) At least once during each working shift, or more often if necessary for safety, each active working area and each active surface installation shall be examined by a certified person designated by the operator to conduct such examinations for hazardous conditions and any hazardous conditions noted during such examinations shall be reported to the operator and shall be corrected by the operator.

Haulage Trucks

Backing Over the Edge

Operators must **STAY ALERT** when operating their haulage trucks near the crest of a stockpile. They must know where their rear tires are in relation to the slope edge. A surprising number of stockpile accidents occur when a haulage truck is simply backed over the edge of a pile. When operators are end dumping over the crest of a stockpile, they must make sure that they are in a designated area with adequate berms or other impeding devices.

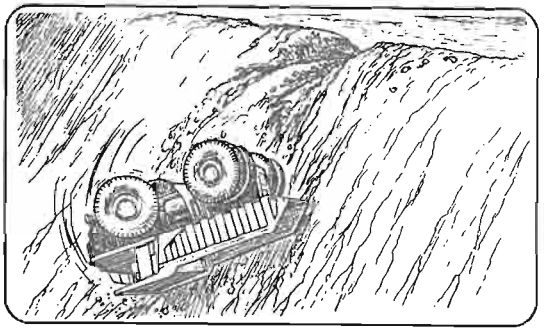
Know where your rear tires are.

Mirrors must be clean and properly adjusted. If dumping at night there should be adequate lighting to see the edge. Brakes must be tested to ensure they are working properly.

Operators should back slowly to ensure there is adequate time to react and stop before contacting the berm. **BERMS CANNOT BE RELIED ON TO STOP A TRUCK.** When a spotter is used, the spotter should stand where his/her signal can be clearly recognized. Spotters should use signal lights at night and when visibility is limited.

Berms

Backing through or over a berm is a common cause of stockpile accidents. A normal rule of thumb is that berm height should be equal to mid-axle height of the largest truck using the dump site. For roadways, this is mandatory under 30 CFR 56/57.9300. The MSHA Program Policy Manual, Volume V, PART 77, Subpart Q, page 202, also requires that berms be equal to axle height of the largest truck at the work site. The berms should be constructed strong enough to survive a moderate impact. However, they should not be used to stop a truck. Berms should be used as a visual indicator of where the truck should be stopped, or to provide a "feeling" of the berm as the rear tires contact it. **A BERM SHOULD BE USED FOR SPOTTING ONLY!**



Don't rely on a berm to stop a truck.

If a berm is present it should not be assumed that it is safe to dump. The haulage truck driver should verify that material has not been removed from the toe of the pile. Routine supervisory inspections should also be performed to ensure that the slope is stable. Federal regulations state that:

30 CFR 56/57.9301 Dump site restraints.

Berms, bumper blocks, safety hooks, or similar impeding devices shall be provided at dumping locations where there is a hazard of overtravel or overturning.

30 CFR 77.1605 Loading and haulage equipment; installations.

(l) Berms, bumper blocks, safety hooks, or similar means shall be provided to prevent overtravel and overturning at dumping locations.

Therefore, depending upon the specific mine, an impeding device other than a berm may be used. **TRUCK DRIVERS MUST MAKE SURE THAT THEY ONLY DUMP WHERE A BERM OR IMPEDING DEVICE IS PROVIDED.**

Dumping in Designated Area

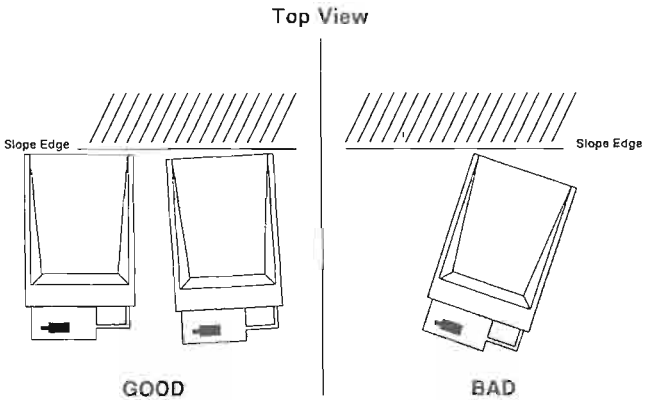
Drivers must dump only at a location designated by the supervisor. **IF A DRIVER IS UNSURE WHERE TO DUMP, THEN HE/SHE SHOULDN'T DUMP.** Drivers should contact their supervisor and determine the correct dumping location rather than to take a chance and dump at a potentially unsafe area. A supervisor may designate dump locations based not only on production requirements, but also on safety considerations that drivers are unaware of. When drivers are assigned to a dump location, they should stay alert for potential hazards and notify the supervisor immediately if a problem is spotted.

Dump at the designated location.

If dumping is done in an area where dozers are being used to push material over the edge of the pile, they should be permitted to do their job. Drivers should dump their loads back from the slope edge as directed. Accidents routinely occur when a truck dumps over the edge where a dozer has been assigned to push material over. In many of these cases, the crest of the pile is not strong enough to support the weight of the truck or the berms are inadequate.

Backing Orientation

When backing at an angle to the slope edge one set of rear duals will reach the edge before the other. If the rear tires on the side of the truck opposite the operator's compartment reach the slope edge first, the chance for an accident increases. This happens when the operator is watching his/her side of the truck and unexpectedly contacts the berm with the other side. The far-side tires contact the berm too hard and the truck either goes through or over the berm. If the berms are inadequate or other impeding devices are not provided, then the operator may simply back the far-side duals over the edge.



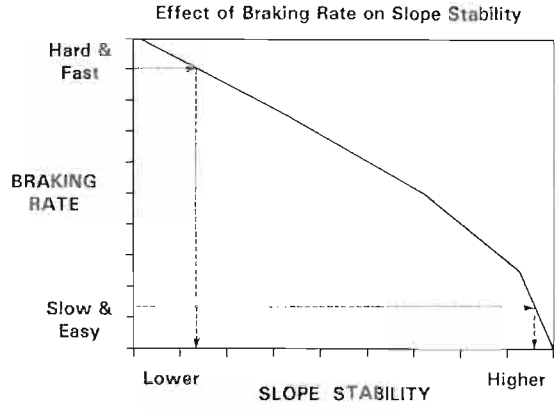
Back square to the slope edge.

It is important for drivers to back their trucks square to the edge of the slope or at a slight angle that places the operator's side closer to the slope edge. Drivers should primarily use the mirrors on the operator's side of the truck when backing. It is much easier to judge backing distance when using these mirrors. They are closer and provide a larger image than the mirrors located on the far side of the truck.

In summary, **DRIVERS SHOULD BACK SQUARE TO THE EDGE USING THE CLOSEST MIRROR, OCCASIONALLY GLANCING AT THE FAR MIRRORS TO CHECK FOR CORRECT ORIENTATION AND POTENTIAL OBSTACLES.**

Backing Speed

Drivers should approach the slope edge at a moderate to slow speed when backing to dump, and apply the brakes gradually while stopping. Braking hard at the last moment imposes a large horizontal force in addition to the normal vertical force imposed by the weight of the truck. This additional horizontal force substantially increases the chance of a slope failure. Even when backing to the slope edge slowly, it is important to brake gradually.



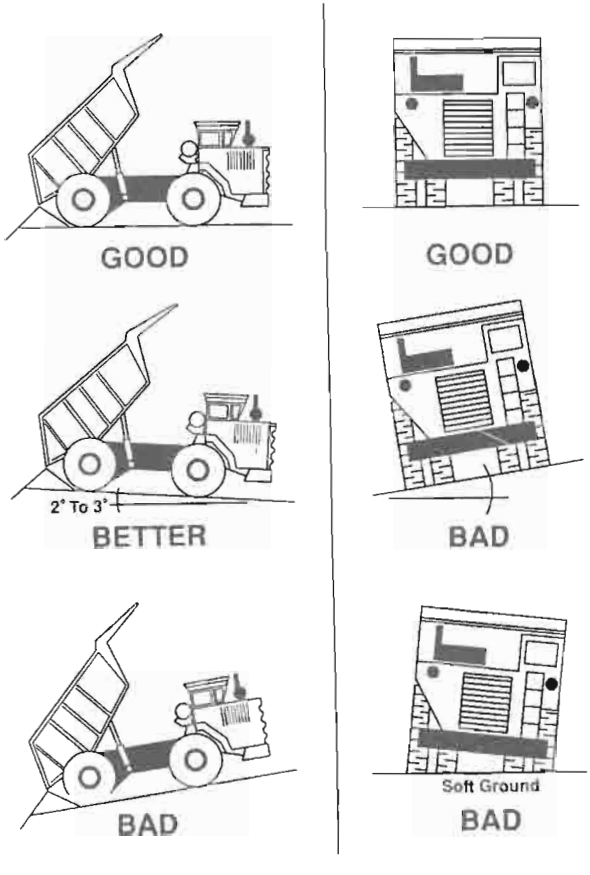
Back slowly and brake easy.

In addition to slope failures, there are other hazards associated with backing too fast. Backing too fast decreases the driver's reaction time to hazards that may develop at the dump point or problems that may develop with the truck. It also increases the risk that the driver will contact the berm too fast, going over or through it.

Dumping on Unlevel Ground

The vehicle center of gravity rises as the truckbed is raised into the dump position. If the truck is parked on a slight downhill grade toward the berm or if it is leaning sideways, it may be in danger of tipping. The potential for tipping increases when the load is hanging up in the truckbed or the material is not flowing out freely.

The dump point should **NEVER** be constructed so the truck is parked on a downward slope toward the berm. If the decline is too steep and material hangs up in the truckbed, then the truck is in danger of tipping over backwards. Sloping the dump point toward the berm also provides poor drainage, allowing water to accumulate at the berm. An accumulation of water at the berm (dump point) can result in decreased slope strength and a soft footing which may allow the rear tires to sink. In addition, stopping on a decline requires additional braking force. This places additional reliance upon the braking system and imposes greater forces on the slope, increasing the potential for a slope failure. **THE DUMP POINT SHOULD BE CONSTRUCTED LEVEL OR AT A SLIGHT UPWARD INCLINE.** Maintaining the dump point at a slight upward angle (1° to 3°) allows for drainage and decreases the amount of force required to stop the truck. It also decreases the chance of tipping over backwards should material hang up in the truckbed.



Use caution when dumping on unlevel or soft ground.

THE DUMP POINT SHOULD BE CONSTRUCTED SO THE HAULAGE TRUCK SITS FLAT, NOT LEANING TO THE SIDE. If the sideways angle is too steep or material hangs up in the truckbed, the truck is in danger of tipping on its side. This is also a problem when the dump point is soft. The rear tires may sink as the truckbed is raised into the dump position. If the tires do not sink evenly, the truck will lean to one side increasing the chance of tipping over. Soft material will also force the operator to apply more power to the drive wheels when approaching the berm, complicating control of the truck in this potentially hazardous area.

Truckbed Position

When you approach the dump site look for any overhead obstructions, such as power lines, which may be in the area. After backing to the dump point bring the truck to a complete stop and apply the parking or holding brake. Follow the procedures provided in the operators manual for the particular truck you are operating.

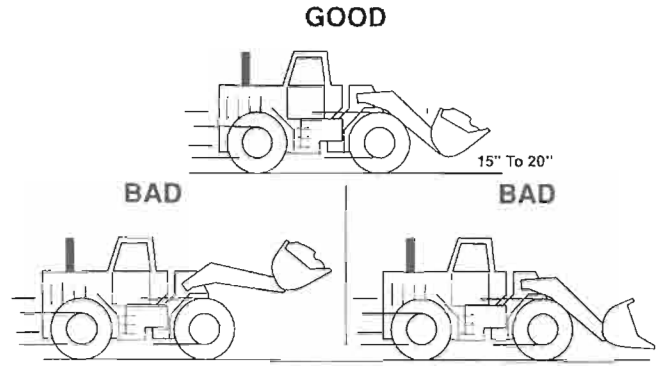
Make sure the truckbed is lowered before leaving dump site.

After dumping the load, pull out slowly. Engage the transmission before releasing the parking brake to prevent the truck from rolling backwards. Lower the truckbed as quickly as possible. If material is hanging up in the bed, moving the truck can increase the chance for tipping over. The truckbed should be fully lowered before leaving the dump site and entering the haul road.

Front-End Loaders

Tramming

It is very important that the bucket be kept low while tramming. This maintains a low center of gravity and provides better stability. It also allows for an unobstructed view of the roadway. The bucket should be tilted back and kept 15 to 20 inches off the ground. When tramming with a full bucket, the bucket should be shaken slightly before starting to remove any loose material that may fall off. When tramming with an empty bucket, the bucket should not be tilted forward or carried too low. The bucket might unexpectedly catch on or hit an obstruction or rough spot in the roadway.



Keep the bucket low and maintain control.

If tramming on a steep grade, the operator should go slow and keep the transmission in a low gear. This will allow higher engine RPM and adequate hydraulic pressure for braking and steering. A lower gear will also help maintain a lower speed with less danger of stalling.

Having the bucket elevated (especially when full) significantly increases the chance of tipping sideways. This can occur when tramming along a slight grade or if the operator inadvertently drives up along the bottom edge of a stockpile or berm. If a loader is trammed on a roadway where a drop-off or danger of rollover exists, the operator should make sure adequate berms are maintained.

When a loader is trammed up an elevated ramp to a feeder, berms become especially important. The ramp slope should be maintained at 10 degrees or less with a level pad provided in front of the feeder. The pad should be at least 1½ times the length of the loader. (The operator should be able to see the top edge of the ramp when starting to back away from the hopper.) Berms should be provided and the sides of the ramp should be constructed lower than the angle of repose to ensure adequate stability.

Loading Trucks

When loading a truck, the impact of material into the truckbed should be minimized. This can be accomplished by loading fines prior to any large chunks, by tilting the bucket slowly to reduce the sudden drop of material, and, when possible, by breaking large consolidated chunks before loading. It is equally important not to strike the truck with the loader bucket or bucket arms. Any sudden impact can cause damage to the truck and injury to the truck driver.

Loader operators should watch for the truck drivers and make sure that they stay in the cab of the truck. If they must get out, have them stand a safe distance from the slope and out of the way of equipment operation. The loader operator should not swing the loader bucket over the cab of the truck or load while individuals are standing next to the truck. The loader operator should keep the load area clean, and when time permits clean up, level, and maintain berms at the top of the pile.

Use caution around other equipment.

Loader operators and truck drivers should stay alert to other equipment that may be operating in the area and the occasional unexpected pedestrian. Windows and mirrors should be clean and properly adjusted. If it is windy and dusty, the loader operator should keep the wind to his/her back while dumping so dust won't obscure vision. Finally, it is important that backup alarms be regularly checked to ensure that they are working properly.

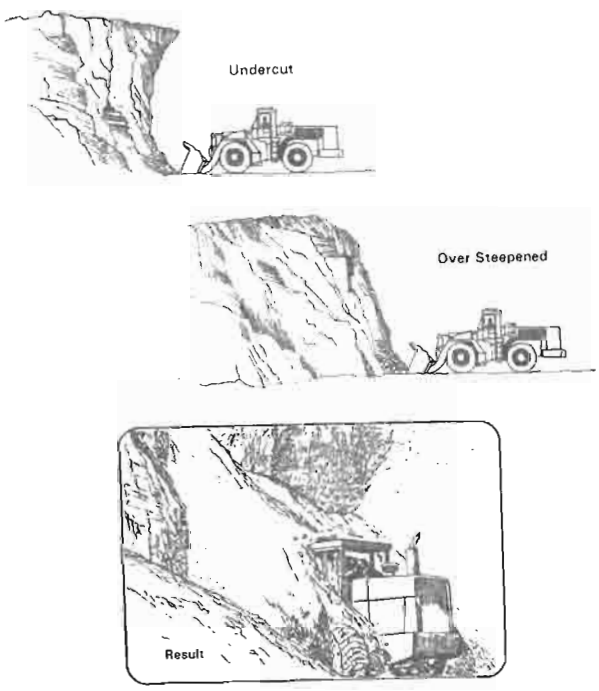
Operating at the Base of the Pile

In most cases when material is removed from the toe of a stockpile, material will collapse and flow down the face of the pile. This is good as the slope remains at the angle of repose maintaining stockpile stability. If the material does not flow easily due to moisture, freezing, or compaction, there is danger of oversteepening or undercutting the pile. This can result in the unexpected fall or collapse of the slope. The loader operating at the base of the pile is in danger of being engulfed by loose material or struck by large consolidated chunks.

The hazard becomes greater as stockpile height increases, especially when the pile becomes higher than the reach of the loader. Slopes not only become weaker with height (for material that does not easily flow), there is more material involved when the slope does fail. If a stockpile, significantly higher than the reach of the loader, begins to become oversteepened or undercut, immediate action is required. Material should be bumped over the crest and the pile worked down from above until the slope approaches the original angle of repose. When possible this should be accomplished with a dozer. (When available, specially equipped machinery such as a long arm backhoe may offer a safer alternative, without the inherent dangers associated with equipment operation on top of the pile.) **IT IS VERY IMPORTANT THAT THE CONDITION NOT BE ALLOWED TO GET SO BAD THAT IT CAN'T BE CORRECTED WITHOUT ENDANGERING WORKERS.** If oversteepening or undercutting routinely occurs, the height of the pile

should be reduced to a height only slightly greater than the reach of the loader.

When pile height decreases so does the danger. If a stockpile only slightly higher than the reach of the loader bucket becomes undercut or oversteepened, use the loader bucket to work the face of the pile from the top down. It is very important that conditions are not allowed to become unsafe before corrective action is taken.



Don't allow the stockpile to become oversteepened or undercut.

If portions of the pile are frozen, then large chunks can slide or fall. They can strike the loader, severely injuring the operator within the cab. They can also bounce into the cab striking the operator. Accidents have occurred where entire cabs have been crushed.

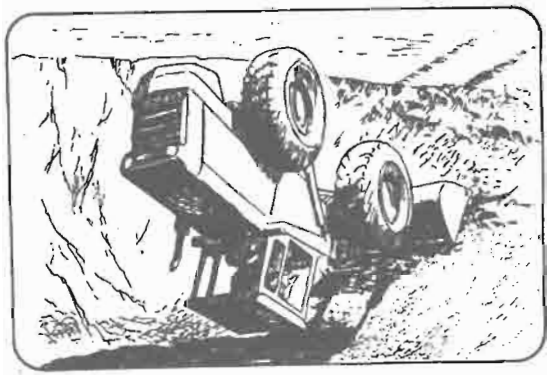
THE LOADER SHOULD ALWAYS BE OPERATED PERPENDICULAR RATHER THAN PARALLEL TO THE BASE OF THE PILE. This places the operator compartment further from the slope. It allows for quicker response in moving the loader should a slope failure occur. In addition, when operating both close to and parallel to the slope, less material is required to bury the cab, and the operator becomes more susceptible to falling or bouncing rocks.

THE LOADER OPERATOR IS IN THE BEST POSITION TO OBSERVE A STOCKPILE HAZARD. If a hazardous situation develops, the loader operator should take immediate action. Other equipment should be prevented from operating at the top or base of the pile until the situation is corrected.

Operating at the Top of the Pile

While operating at the top of the pile, front-end loaders are subject to many of the same hazards as haulage trucks. These hazards include driving over the edge, going through or over an inadequate berm, or being involved in a slope failure. As with haulage trucks, most of the slope failures occur as a result of material being removed from the base of the pile. In addition, when operating close to and parallel to the slope edge, material settlement or soft ground may be sufficient to tip the loader over or cause the operator to lose control.

THE BEST METHOD TO PREVENT LOADER ACCIDENTS AT THE TOP OF A PILE IS TO KEEP THE LOADER PERPENDICULAR TO AND FACING THE SLOPE EDGE. This keeps the weight of the loader further from the slope edge and lowers the chance of tipping or leaning sideways if the edge settles. It also allows you to quickly back the loader out of danger should a hazard develop.



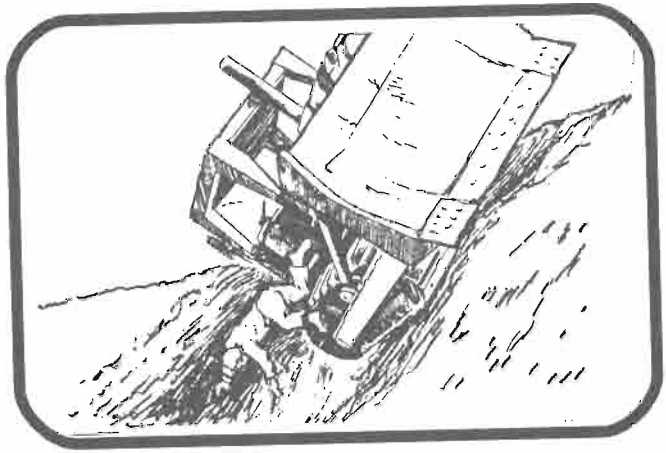
Keep loader perpendicular to the slope edge.

Pushing Material

The power, stability, and traction of dozers can result in a false sense of security. Operators should never become overconfident in the capabilities of the dozer or in their capabilities of operating it. When pushing material over the crest of a stockpile or waste dump, the operator should stop a safe distance from the edge and use other material to bump it over.

THERE SHOULD ALWAYS BE A BERM MAINTAINED AT THE CREST OF THE PILE to prevent equipment operators from inadvertently going over the edge. When working or leveling the top of the pile, operators must keep track of where the edge is. Many accidents occur when the dozer unexpectedly backs over the edge of a pile.

The dozer should always be perpendicular to and facing the slope edge. This will allow a quicker response in backing from the edge should a slope failure or settlement occur. An operator should **NEVER** run the dozer along the slope edge. The weight and vibration of the machine increase the chance that a slope failure and rollover will occur. When operating parallel to the slope edge, there is also less room and time to respond in case of operator error.



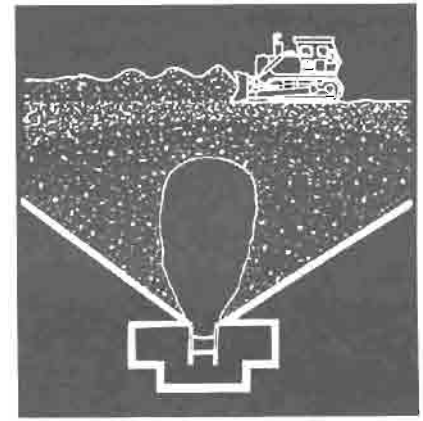
Never push a load completely over the edge. Use the next load to bump it over.

Dozer operators should always watch for signs of slope instability such as cracks along the crest or slumping on the slope. If there are visible signs of slope instability, operators should maintain a safe distance from the edge. They should be alert to the changes in ground conditions resulting from the weather (rain, sleet, snow, freezing and thawing). If material is removed from the base of the pile, they should inspect the slope for oversteepening, undercutting, and overhangs. Dozer operators should always keep the blade low and operate at a speed consistent with the type of work being performed and the current ground conditions.

If it is necessary to work on the face of a pile, dozer operators should work the slope vertically. They should keep the blade facing downhill and should back up the slope before beginning the next pass. This will reduce the chance of sliding sideways or rolling over.

Draw Points

Stockpiles and surge piles that have material being removed by underground feeders can be particularly dangerous. Two major hazards exist: the weak material around the draw hole and the possibility of hidden cavities (bridged material).



Never operate mobile equipment over a draw point.

As the underground feeder removes material, a draw hole is formed. The top edge of the draw hole is very unstable and always near collapse. When a dozer is operated close to the edge, it can induce a slope failure and slide down into the draw hole. Injuries and fatalities occur when material sloughs down on top of the dozer, either crushing or suffocating the operator. **OPERATORS SHOULD NEVER PUSH MATERIAL DIRECTLY INTO THE DRAW HOLE.** They should bump it in with other material, keeping the dozer a safe distance away from the edge.

When working near the draw hole, the dozer should always be operated perpendicular to the edge of the draw hole. Operators must stay alert to the location of the draw point and use caution not to back or slip into it. The location of each draw point should be clearly indicated by a marker, such as a brightly colored object suspended directly above it.

OPERATORS MUST NEVER GET OFF THEIR DOZER AND WALK TO THE EDGE OF THE DRAW HOLE. They could easily be drawn into the material flowing into the feeder.

Use extreme caution on surge piles located over draw points.

Occasionally the draw point may bridge over. This can be especially dangerous as it may be impossible to determine the exact size and location of the cavity under the bridged material. Material may continue to flow into the plant as the cavity forms. There may not be any indication of a problem to the plant personnel. The dozer operator should have a direct means of

communication, such as a two-way radio, with plant personnel to determine which feeders are being used and the amount of material being removed. Feeder locations should be clearly marked, by using large markers or lights suspended directly above the feeders. The dozer operator should also be provided with a means to shut down the feeder and stacker belt from the cab. With this information and an inspection of the surge pile, it may be possible to determine if a bridge has formed.

Injuries and fatalities occur when the bridged material fails under the weight of the dozer allowing it to fall into the cavity and become buried. **IF AN ACCIDENT DOES OCCUR IT IS EXTREMELY IMPORTANT THAT THE DOZER OPERATOR STAYS IN THE CAB.** If a cavity is known to exist, operators must use extreme caution keeping the dozer a safe distance from the draw point. It may become necessary to remove material from the pile in order to safely collapse the cavity. The material should be removed from the side of the pile carefully working toward the cavity.

It is recommended that equipment operating on surge piles be provided with **CABS STRONG ENOUGH TO RESIST BURIAL PRESSURE, OR USE REMOTE CONTROL EQUIPMENT.** The windows of dozers can be made to withstand burial pressure by a combination of installing supports and improving the edge support for the glass, and using high-strength (such as chemically-strengthened) glass. Self-rescuers, radio communication, and lighting should also be provided so that the operator can be rescued in the event of an accident.

Scrapers

Soft material along the crest of a pile can allow the tires to sink, pulling the scraper over the edge. On side slopes, scrapers become very unstable and can easily roll over. If a scraper goes over the edge, the operator should stay with the machine and ride it out. In some circumstances, the operator may be able to apply power to keep the scraper steered straight down the slope.

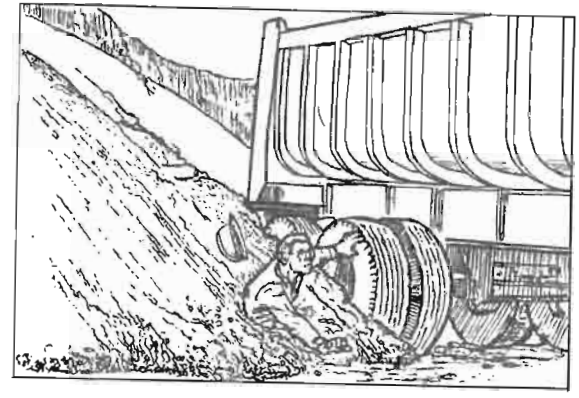
Operators should always slow down before turning and should never turn sharply when going uphill or downhill, especially downhill. If running along a hillside they should go slowly and turn very carefully. They should never get on a steep side grade.

Maintain a safe speed and never turn sharply when operating on a hill.

Operators must know the traffic patterns and always give right-of-way to loaded machines. When tramming, the bowl should be kept as low as conditions permit to increase stability.

Highway Trucks

Highway truck drivers should be encouraged to stay in their trucks with their seat belts fastened. They may not be aware of the hazards around stockpiles and mining equipment. If truck drivers must get out of the truck, they must stand a safe distance from the stockpile and out of the way of equipment operation.



Truck drivers should stay in their truck.

Many accidents occur when truck drivers are engulfed by falling material while standing between their truck and the stockpile. In most cases they are unaware of the hazards associated with oversteepened slopes and the potential of material movement. **HIGHWAY TRUCK DRIVERS SHOULD NEVER BE ALLOWED TO STAND BETWEEN THEIR TRUCK AND THE STOCKPILE** (30 CFR 56/57.3430).

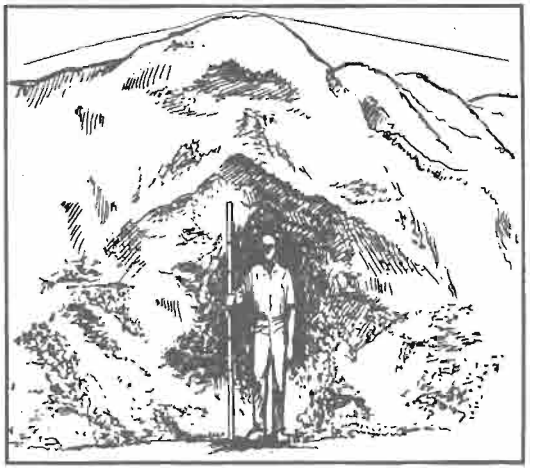
The truck driver is also in danger of being struck by material falling out of the loader bucket or spilling over the truck as it's being loaded. This can occur while the driver is walking behind or alongside the truck. In addition, the truck driver may not be aware of the large blind spots behind mining equipment, and may inadvertently place himself/herself in an unsafe position.

MATERIAL SHOULD NEVER BE LOADED OR SWUNG OVER THE CAB OF THE TRUCK. If this must be done then the driver must exit the truck and stand in a safe location. The driver could remain in the truck if it is equipped with falling object protection; however, this is very rare on highway trucks.

On Foot

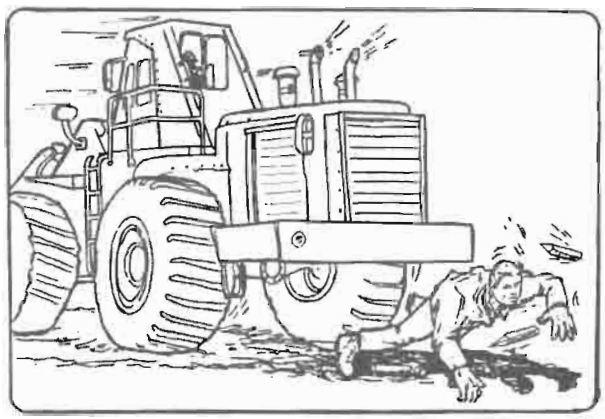
Persons should only be on or around a stockpile if their work requires it. **IF WORKERS MUST BE ON FOOT AND WORK AROUND A STOCKPILE, THEY MUST NOTIFY THEIR SUPERVISOR AND ALL EQUIPMENT OPERATORS.** In most cases, and for good reasons, pedestrians are not allowed on or near stockpiles. The amount of equipment activity and unstable nature of the material presents too many hazards to persons on foot.

When working around a stockpile, workers should stay away from the toe. They could easily be engulfed or struck by falling material which has been dumped at the top of the pile or has fallen from a sudden collapse of an oversteepened or undercut slope.



Stay away from the toe of a stockpile.

Workers must make sure loader operators and truck drivers are aware of their presence. Equipment operators do not expect people on foot when working around the pile and they cannot be counted on to see someone on foot. In addition, most mobile mining equipment will have large blind areas where the operator is unable to see.

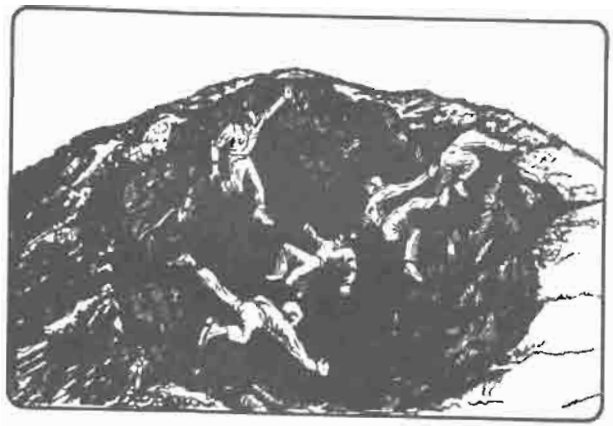


Workers on foot must stay alert to backup alarms and be ready to move in a hurry if necessary.

When working at the top of the pile, workers should stay away from the edge. The edge can unexpectedly fall away at any time, especially when material is being removed from the toe. In addition, when walking along the top edge of the pile, the footing is usually bad and the worker could simply trip and fall. When the material

they are standing on begins to move or collapse, it is very easy to get sucked in and trapped.

A person can become entrapped in material that is only knee deep and suffocate in material that is only chest deep. When buried to the chest, the material closes in as the person breathes in and out, packs tightly, and eventually makes breathing impossible.



Do not stand on the top edge of a stockpile.

Workers should never walk on a surge pile where material is being, or has been, removed by an underground feeder.

Workers can be caught and drawn into material that is gradually being worked down by the feeder, or they can suddenly fall into a cavity that is covered by bridged material. The weight of an individual is sufficient to cause bridged material to collapse. If workers must work on a surge pile, they should make sure that all feeders that supply or remove material from the pile are locked out. They should also make sure that enough material is removed from around the draw point to prevent an unexpected collapse. When working on a surge pile where hazardous conditions exist, workers should make sure that someone can see them and that they can maintain two-way communications. Because of the danger of encountering a bridged-over cavity, ladders, platforms, or some other form of support should be provided. The person involved should wear a safety belt or harness, with a lifeline, and a second person should keep the line taut.

In general, MSHA regulations state that:

30 CFR 77.209 Surge and storage piles.

No person shall be permitted to walk or stand immediately above a reclaiming area or in any other area at or near a surge or storage pile where the reclaiming operation may expose him to a hazard.

30 CFR 56/57.9312 Working around drawholes.

Unless platforms or safety lines are used, persons shall not position themselves over drawholes if there is danger that broken rock or material may be withdrawn or bridged.

30 CFR 56/57.16002 Bins, hoppers, silos, tanks, and surge piles.

(a) Bins, hoppers, silos, tanks, and surge piles, where loose unconsolidated materials are stored, handled or transferred shall be:

(1) Equipped with mechanical devices or other effective means of handling materials so that during normal operations persons are not required to enter or work where they are exposed to entrapment by the caving or sliding of materials; and

(2) Equipped with supply and discharge operating controls. The controls shall be located so that spills or overruns will not endanger persons.

(b) Where persons are required to move around or over any facility listed in this standard, suitable walkways or passageways shall be provided.

(c) Where persons are required to enter any facility listed in this standard for maintenance or inspection purposes, ladders, platforms, or staging shall be provided. No person shall enter the facility until the supply and discharge of materials have ceased and the supply and discharge equipment is locked out. Persons entering the facility shall wear a safety belt or harness equipped with a lifeline suitably fastened. A second person, similarly equipped, shall be stationed near where the lifeline is fastened and shall constantly adjust it or keep it tight as needed, with minimum slack.

Summary

Safety is the responsibility of everyone, from the equipment operator to the mine manager. Only through the active involvement of all employees can a safe work environment be ensured. A good safety attitude reflects well upon the professionalism of American miners, and can be used as a tool to enhance competitiveness. An active safety program can instill teamwork, improve communication, and reinforce to the employees their value to the mining operation.

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SAFETY MANUALS

Accident Investigation
Accident Prevention
Back Injuries in the Mining Industry
Coal Mine Maps
Coal Mine Roof and Rib Control (Historical)
Coal Mining
Coping with Substance Abuse in Mining
Electrical Hazards
Fire Safety
First Aid
Heat Stress in Mining
Industrial Hygiene for Healthier Miners
Job Safety Analysis
Laboratory Safety (Historical)
Mine Escapeways
Mine Gases
Mine Ventilation
Permissibility – Electric Face Equipment
Personal Protective Equipment
Radiation Hazards in Mining
Stockpiling Safety
Surface Haulage Safety
Winter Alert