



State of Ohio Environmental Protection Agency

Northeast District Office

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Ted Strickland, Governor
Lee Fisher, Lieutenant Governor
Chris Korleski, Director

February 13, 2008

**RE: Elkem Metals Company
Ashtabula County
Closure Plan
Notice of Violation / Deficiency**

CERTIFIED MAIL

Mr. Geir Kvernmo
President
Elkem Metals Company
1013 Centre Road
Wilmington, DE 19805

and

Mr. Geir Kvernmo
President
Elkem Metals, Inc.
Airport Office Park Building 2
400 Rouser Road
Moon Township, PA 15108

Dear Mr. Kvernmo:

On August 1, 2005, Ohio EPA received the following document titled "Final Closure/Post Closure Plan, Stabilization, Final Cover Installation, Construction Quality Assurance (CQA) and Post-Closure Maintenance, Elkem Metals Company-Ashtabula, LP, Settling Ponds 3 and 3A, July 2005." The plan proposes the solid waste closure of Ponds 3 and 3A at the Elkem Metals Disposal Site which is located at 2700 Lake Road East, Ashtabula Township, Ashtabula County. Mr. David Garrett, who is a technical consultant for David Garrett Engineering and Geology, prepared the plan on behalf of the company.

The plan was submitted pursuant to January 10, 2005, Director's Final Findings and Orders (DFFOs). Elkem is required through this legal document to cease acceptance of waste and close the ponds. The waste placement area consists of a single, unlined unit of approximately 66.1 acres of waste placement. The latest revisions on September 5, 2007 were submitted in response to Notices of Violation and Deficiency dated February 15, 2006, and February 17, 2006.

Ohio EPA – Division of Solid and Infectious Waste Management (DSIWM)-Northeast District Office (NEDO) has completed a review of the revised plan. The following information is attached: Attachment A - Violations, Attachment B - Deficiencies and

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Attachment C - Comments. Portions of the closure plan are under review by Ohio EPA's Division of Drinking and Ground Waters (DDAGW)-(NEDO). Additional deficiencies and comments will be forwarded under separate cover once the groundwater review is completed. In addition, the Stormwater Pollution Prevention Plan is being reviewed by Ohio EPA – Division of Surface Water (DSW)-NEDO. Their review comments will also be forwarded at a later time.

In accordance with Order 16 of the DFFOs, Elkem shall respond with a written response that addresses all of the comments no later than 30 days from the date of this letter. Revisions to this plan should be forwarded to Mr. Murat Tukul of this office. If you have comments or questions, please feel free to contact me at (330) 963-1186, or jerry.parker@epa.state.oh.us.

Sincerely,



Jerry L. Parker
Environmental Engineer
Division of Solid and Infectious Waste Management

JLP:cl
Attachments

cc: Judy Bowman, DSIWM-NEDO
Colum McKenna, DSIWM-NEDO
Russ Kocher, DDAGW-NEDO
Barry Chapman, DSIWM-CMEU
John Hujar, DSIWM-NEDO
Jeff Hurdley, DSIWM-Legal
Chris Moody, DSW-NEDO
David Renfrew, Elkem Metals
Robert Karl, Ulmer & Berne, LLP
Ray Saporito, Ashtabula County Health Department
David Garrett, David Garrett Engineering and Geology
File: [Tukul/Coun/Elkem Metals/Cor/04]

DSIWM #773

**ELKEM METALS COMPANY
FINAL CLOSURE PLAN
NOTICE OF VIOLATION / DEFICIENCY
ATTACHMENT A
VIOLATIONS
FEBRUARY 13, 2008**

**I. VIOLATION ONE
CAP DESIGN
DRAINAGE SYSTEM**

Order 7C of the January 10, 2005 Director's Final Findings and Orders (DFFOS) specified a drainage system consisting of an aggregate and perforated pipe in the cap system. This component was required unless a deviation was presented to demonstrate technical feasibility and did not result in any adverse impact to public health or safety or the environment. In Section 4.4.1, "Cap Design", page 4-8, Ohio EPA did not see any information pertaining to a drainage system nor was a deviation presented in this section. On page 2-2 of Section 2.2, "Variances", the text states that OAC 3745-27-08(D)(25), which is the cap drainage layer, does not apply. In addition to remaining in violation of this order, the same issue was cited as Violation Three, page 3 of 24, in the February 16, 2006 Notice of Violation (NOV) / Notice of Deficiency (NOD) letter.

**II. VIOLATION TWO
LEACHATE COLLECTION SYSTEM
SEWER LINE EXTENSION**

Order 7C of the DFFOs specifies a leachate collection system around Ponds 3 and 3A which may include the perimeter canal system without an additional liner that is capable of collecting and conveying all leachate to a treatment system and the sewer line extension required under Order 7D. On page 1-3 of the closure plan, it is written that leachate disposal at a local POTW or on-site treatment works are under consideration. On page 8-5, it states that the perimeter canal will continue to be pumped to one of the lower wastewater ponds (i.e., Pond 4A or 5C) for a few years following completion of the final closure of Ponds 3 and 3A. Similar to Violation Four of the February 15, 2006 NOV / NOD letter, page 3 of 24, Elkem remains in violation of Order 7D. The Closure / Post Closure Plan must contain a sewer line extension to be constructed during closure of Ponds 3 and 3A that is capable of conveying leachate from ponds 3 and 3A to the local publicly owned treatment works (POTW).

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DEFICIENCIES
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**I. DEFICIENCY ONE
SUMMARY
FACILITY DESCRIPTION**

A description of the facility is provided in Section 1.2, page 1-2 of the closure plan. In the latter part of the second paragraph of this section, the text mentions that a decant structure is located in the northeast corner, along the interstitial embankment between Ponds 3 and 3A. Although it appears that the structure and the embankment should be identified on Plan Sheet S3, "Existing Conditions Map with Test Boring Locations", Ohio EPA was unable to locate this information. In addition to revising the drawing to include this information, the sheet should reflect other existing items such as perimeter roads and embankment benches.

**II. DEFICIENCY TWO
FACILITY DESCRIPTION
PERIMETER CANAL SUMP**

In the middle of page 1-3, a description of the perimeter canal sump is provided. In attempting to verify the location of this sump, a pumping station for perimeter canals was identified approximately 500 feet to the northwest of the limits of waste placement for Pond 3. The sump, however, is located around 150 feet from the canals. In addition to verifying that the sump described in the text is the same sump on the plan sheet, the revised text should reference the appropriate plan sheet. If the sump is included in the proposed leachate collection system, a detail of the sump is requested.

**III. DEFICIENCY THREE
PROJECT MILESTONES
ORDER 7B**

At the bottom of page 1-8, the following text is provided: "...In respect to Order No. 7, OEPA-NEDO staff did review the document and provided written comments ca. February 15, 2006. Elkem responded in writing, indicating which comments could be accommodated with the provisions of the Orders and which could not. The differences lie in the variances recognized by OEPA officials during the negotiation of the Orders, whereas sufficient technical justification was previously provided to allow the Orders to be finalized..." In response, Order 7 reiterates the following language in several locations: "...To the extent that Respondents propose to deviate from the closure requirements of OAC Rules 3745-27-08, 11(A), (C)-(G), and (I) and 12,

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Respondents shall include in the Closure / Post-Closure Plan a specific description of any deviation from the closure requirements of OAC Rules 3745-27-08, 11(A), (C)-(G), and (I) and 12 that are permitted under these Orders, the rationale for the deviation and a demonstration of how the deviation is technically feasible and will not result in any adverse impact to public health or safety of the environment..." The Order continues by specifying that the engineered components cannot involve the use of solid waste or other waste materials.

During the review of Section 2.0, "Variances", it was observed that Elkem detailed the "applicable" rules with noted deviations and "non-applicable" rules which were originally presented in the negotiation of the Orders. The summary included the entire chapter of OAC 3745-27. Based on this information, Ohio EPA expresses the following issues. First, as stated in Comment Three, any reference to negotiation of the Orders should be removed. Second, Order 7B is very clear as to which rules can be deviated. Finally, as per Deficiency Three of the February 16, 2006 NOV / NOD letter, page 4 of 24, Elkem was directed to include a section that clearly identifies all exemptions and variances being requested as part of the plan, citing the appropriate sections of the DFFOs, as applicable. As a result, Ohio EPA suggests that Section 2.0 be revised to reflect only the specific rules addressed in the Order.

**IV. DEFICIENCY FOUR
SLOPE STABILITY ANALYSIS
POST-CLOSURE
PREVIOUS MONITORING DATA**

During a review of Section 3.8, "Stability Analysis" of the revised closure plan, Ohio EPA concluded that Elkem has not responded to Deficiency 4 of the February 17, 2006 Notice of Deficiency (NOD) letter. For your convenience, the deficiency is as follows:

"...On page ten (10), Section 4.3, "Slope Inclinometers", and Section 4.4, "Settlement and Water Level Monitoring" of the closure plan, there are several references to prior monitoring of the landfill. In Section 4.3, it states "...Slope inclinometers were installed in 2001 along the embankment of Ponds 3A and a portion of Pond 3 to facilitate monitoring for potential movements during vertical loading of the pond interiors..." Section 4.4 states "...Periodic monitoring of settlement and water levels in the embankments has occurred over the last couple decades...Settlement data indicates no significant movement...Water level observations are not critical...". Also, page eleven (11), Section 4.7, "Post-Closure

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Stability Contingency Plan", indicates that ongoing stability monitoring has demonstrated that the pond embankments are stable, with no movements indicated. In order to confirm these conclusions, Elkem, however, has not provided any data which substantiates these statements.

**V. DEFICIENCY FIVE
CLOSURE PLAN REQUIREMENTS
EXPLOSIVE GAS CONTROL SYSTEMS**

Order 7C requires a modified or nonexistent explosive gas monitoring system depending on the nature of the waste materials in Ponds 3 and 3A. In Section, 4.3.4, "Explosive Gas Control Systems", page 4-4, the following text is provided: "...The installation schedule for explosive gas control systems is inapplicable, per the Orders. The inert manufacturing residuals contained in Ponds 3 and 3A are non-reactive and non-putrescible. No explosive gases are anticipated base on the nature of the waste..." Similar responses are included in Section 4.3.8, page 4-5 and Section 4.4.2, page 4-8. In Section 8.5.4, page 8-7, it is written that waste materials are not combustible. These statements are contrary to Findings 15, 18, 19, 32, 34 and 40 of the DFFOs. These findings provide a description of mixed solid waste with calcium carbide which releases acetylene gas. Although Attachment 9 of Section 5.0 is titled, "Material Properties", this attachment appears to address the evaluation of the waste from a settlement perspective. Elkem is required to submit the supporting documentation for this characterization.

**VI. DEFICIENCY SIX
CLOSURE PLAN REQUIREMENTS
CAP MATERIAL**

On page 4-5, Section 4.3.6 states the following: "Suitable soils for construction of the final cap are now stockpiled on site. The stockpile contains an estimated 275,000 cubic yards of indigenous silt-clay, derived from a nearby project site. Based on the final grading plan for Ponds 3 and 3A (see Drawing E3), the required additional soil balance is 200,000 cubic yards (Appendix J)..." Upon review of this appendix, Ohio EPA was unable to confirm the above balance. It appears that the volume of 275,000 cubic yards (cys.) refers to the soil that was placed in Pond 3A. With respect to the soil required for the protective cover component of the cap system, a volume of approximately 150,000 cys. was calculated. Elkem is requested

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to clearly document the soil balance and specify the source of this material. Similar information was requested in the February 15, 2006 NOV / NOD letter, page 11 of 24, Deficiency Eight.

**VII. DEFICIENCY SEVEN
QA / QC PLAN
ENGINEERED SUBBASE
ORDER 7B**

OAC Rule 3745-27-08(D)(22) specifies the design, construction and testing specifications for the engineered subbase. As stated in the introduction of the rule, the subbase shall be placed under a geosynthetic clay liner (GCL) if a GCL is proposed. The rule has eight sub-sections: (a) through (h). In the middle of page 2-2 of the closure plan, it is written that (a), (b), (d) and (f) through (h) apply. As for the inapplicability of sub-sections (c) and (e), the plan states that it was determined that on-site materials (solid waste) could be used for a subbase as per preliminary plans in the negotiation of the Orders.

In the introduction of Section 6.3, "Engineered Subbase", page 6.3-1, the following language is provided: "...Please note that the subbase may be constructed of soil and/or pond soils (with alternative testing requirements as approved by the engineer)..." Order 7B, however, expresses that a rationale for the deviation and a technical feasibility demonstration be provided to show no adverse impact to public health or safety or the environment. Also, as stated earlier in this deficiency, the Order continues by specifying that the engineered components cannot involve the use of solid waste or other waste materials. The revised closure plan should include this information as required by the Orders. Elkem should also be reminded that Deficiency 6ci of the February 15, 2006 NOV / NOD letter, page 6 of 24, requested an engineered subgrade in adherence with OAC 3745-27-08(D)(22) as specified by OAC 3745-27-06(B)(7).

**VIII. DEFICIENCY EIGHT
QA / QC PLAN
ENGINEERED SUBBASE
ACCEPTANCE CRITERIA**

Section 6.3.2.1, "Control Tests", page 6.3-1, states that any unsuitable material will be rejected or routed to separate stockpiles consistent with its end use. Later in the section, it is written that the control tests are provided in Table 6.3.1. Upon review of

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the table, it indicates that there is a visual classification, however, acceptance criteria were not provided. Also, the property of moisture-density relationship was provided in both Tables 6.3.1 and 6.3.2 without any acceptance criteria. The revised QA / QC Plan should have specific criteria for each property of this component. Deficiency 8bii, page 12 of 24, of the February 15, 2006 NOV / NOD letter, cited the same issues.

**IX. DEFICIENCY NINE
QA / QC PLAN
ENGINEERED SUBBASE
PARTICLE SIZE**

On both pages 6.3.2 and 6.4.2, the following statement is made: "...the Engineered Subbase providing those materials exhibit sufficient density and strength in the opinion of the CQA Engineer, and provided that no sharp objects or particles that exceed ¾ inches are visible." The specification in OAC Rule 3745-27-08(D)(22)(e) requires no sharp edged protrusions and any particles protruding more than one quarter of one inch. In addition, the following specification is provided in Section 4.4.1, page 4-8: "...maximum particle size of ¾ inch." Elkem is asked to explain these inconsistencies.

**X. DEFICIENCY TEN
QA / QC PLAN
ENGINEERED SUBBASE
JUDGEMENTAL TESTING
POTENTIAL PROBLEMS**

Section 6.3.4.5, page 6.3-2, indicates that the testing frequency may be increased if visual observations of the construction performance indicate a potential problem. Although additional testing will be performed, the text does not provide any possible resolutions to correcting the problem which consist of slipping, dirt-clogged and non-optimum ballast rollers.

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**XI. DEFICIENCY ELEVEN
QA / QC PLAN
GCL-GM COMPOSITE
SPECIFICATIONS**

On page 6.4-1 of Section 6.4.3.2, the text states that the GCL-GM Composite will be protected by the project specifications. In addition, Section 6.10, "Side Slope Contingency Work", of QA / QC Plan refers to Project Specification 02712. Although it appears that the technical specifications are provided in Section 7.0 of the closure plan, the information in that section needs to be combined with the proposed QA/QC Plan to create a stand alone QA / QC Plan which addresses both OAC 3745-27-06(C)(9)(c) and OAC 3745-27-08.

Also, Section 6.4.3.4 is titled "GCL-GM Composite Material Control Tests". On page 6.4-1 of this section, it is written that the material control tests are shown on Table 6.5.1. The correct reference should be Table 6.4.1. After a review of the table which included only two properties (bentonite content and tensile strength) and no acceptance criteria, Ohio EPA observed that the CQA testing program for this material is very deficient. With respect to the flexible membrane liner, the following list of properties typically included in an QA / QC Plan are as follows: thickness, asperity height, sheet density, carbon black content, carbon black dispersion, tear resistance, oxidative induction time, oven aging, UV resistance. Characteristics for the geomembrane resin usually include density and melt flow index. GCL is normally evaluated for the following parameters: free swell, fluid loss, mass / unit area, grab tensile strength, tensile properties, thickness and permeability. The revised plan should address these issues. In the NOV / NOD letter of February 15, 2006, Deficiency 8dii outlined these concerns on page 13 of 24.

**XII. DEFICIENCY TWELVE
QA / QC PLAN
DRAINAGE SYSTEM**

As cited in Violation One, Ohio EPA notes that the proposed design does not include a drainage system for the cap system. In addition, an adequate technical justification was not provided pursuant to the January 10, 2005, DFFOs. The revised closure plan must contain an adequate justification or a full drainage layer that meets the requirements of OAC 3745-27-08(D)(25). If a drainage system is chosen, the QA / QC Plan should be revised to include the appropriate specifications and testing.

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**XIII. DEFICIENCY THIRTEEN
QA / QC PLAN
VEGETATIVE LAYER
SPECIFICATIONS**

Page 6.5-1 includes a reference to Table 6.5.1 which includes the following vegetative layer specifications: visual classification, grain size analysis and atterberg limits. In addition to the absence of acceptance criteria for these items, a specification for the lift thickness has not been established.

**XIV. DEFICIENCY FOURTEEN
QA / QC PLAN
DRAINAGE PIPE
TRENCH BACKFILL**

At the top of page 6.6.-2, there is a reference to Section 6.3 for the trench backfill requirements. Since Section 6.3.0 specifies the backfill requirements for the engineered subbase, the drainage pipe section should be more specific as to which requirement is being referenced in that section. In addition, Drawing No. D2, Detail C/E2, refers to tamped fill bedding while Note 5 of detail B/E2 specifies compacted soil. Table 6.6.1, page 6.6-2, meanwhile, includes specifications for coarse aggregate for the storm pipe network. The properties in the table included gradation, type and diameter, correct fittings and seals and splits or end damage. Typical specifications for aggregate include sieve analysis, permeability and carbon content. Finally, in Section 6.7, "Aggregates", there is no reference in the introduction to pipe bedding as an application for this material. The revised QA / QC plan should resolve these various issues.

**XV. DEFICIENCY FIFTEEN
QA / QC PLAN
AGGREGATES
SPECIFICATIONS**

In Section 6.7.2.1, page 6.7.1, a reference is made to Table 4.1 when the correct reference is Table 6.7.1. In looking at the table, similar deficiencies were noted in Deficiency Fourteen with respect to the appropriate parameters that need to be evaluated. The table also includes a woven geotextile component which only has a

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visual classification test method. The geotextile properties usually consist of: mass per unit area, grab tensile, trapezoid tear, puncture strength, permittivity and UV resistance. Elkem should provide further information in the subsequent submittal.

**XVI. DEFICIENCY SIXTEEN
DEWATERING AND SURFACE STABILIZATION
SETTLEMENT PLATES**

On page 4-6, Section 4.3.10, of the closure plan, the following text is provided: "...Carefully staged placement of fill materials on the drained surfaces will be used to avoid an undesirable "mud-wave", accompanied by settlement monitoring (with settlement plates) during fill placement to determine when settlements are completed (if any occur) prior to placing barrier material..." Upon completion of the fill placement, Ohio EPA requests that Elkem submit a report to include the following: summary of fill activities, use of the settlement plates and the conclusion of any settlement issues.

**XVII. DEFICIENCY SEVENTEEN
COMPOSITE CAP SYSTEM
FINAL SLOPE**

In Section 4.4.1, "Cap Design", page 4-8, it is written that the assumed grade of the cap used in the model is 2 percent which is the practical upper limit on achievable grades, given the geometry of the site and the nature of the facility. Although Order 7B authorized deviations from OAC 3745-27-08 which specifies a minimum five percent slope, the Order also required the change to be technically feasible and to not result in the any adverse impact to public health or the environment. Based on the information that has been demonstrated, Ohio EPA is unable to concur with the deviation.

**XVIII. DEFICIENCY EIGHTEEN
COMPOSITE CAP SYSTEM
10% SLOPE**

In Section 4.4.1, "Cap Design", page 4-8, the text states: "Maximum slopes on the final cover barrier will be 10 percent near the drainage features (see construction plan drawings)." Upon reviewing the drawings, Ohio EPA observed a note in the northeast corner of Drawing No. E1 which states "Compacted soil berm (above barrier) to divert surface water runoff toward catch basin." On plan sheet, Detail B /

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D1, is titled "Diversion Berm Detail. A note for the detail, however, states that the berm applies to only Channel #1. In addition, the slope on the "landfill side" of the berm is 3:1 versus 10% (10:1). Also, in looking at the cross-sections for the stability analysis in Appendix H, it is difficult to determine if the shallow failure analysis included the 10% slope. As a result, the revised closure plan should include the appropriate information for both of the 2% and 10% slopes such as cross-sections and details. Although a final cover detail is provided on Plan Sheet D3, Detail B/D3, the detail does not designate the slope.

**XIX. DEFICIENCY NINETEEN
CAP DESIGN
SLOPE STABILITY**

At the top of page 4-9, the following language is provided: "...Based on the stability analyses, all relevant safety factors are met by the closure design, with the provision that water levels need to decrease another 3 feet at cross-section P2 along the south embankment of Pond 3, coinciding with the seepage zone discussion discussed in Section 4.3.10, to bring the safety factor to a minimum of 1.50. During the closure construction and post-closure periods, activities related to maintaining slope stability will include continued monitoring of settlement plates, piezometer levels and slope inclinometers..." In Section 4.3.10, it states "...Seepage observed along a portion of the south embankment of Pond 3 is tied to the surface infiltration along the upper surface, where grades do not presently promote positive drainage and infiltration is temporarily elevated-soon to be corrected..." In addition to providing an updated status of correcting the drainage issue, Elkem is requested to be more specific with respect to monitoring the south embankment of Pond 3 to ensure that the water level will decrease by 3 feet.

**XX. DEFICIENCY TWENTY
CAP DESIGN
SURVEY MARKS**

Section 4.4.5.1, page 4-9, provides a discussion on the survey information for this project. Since there is some inconsistencies between OAC 3745-27-08(D)(1)(c), Section 6.8.2 in the QA / QC Plan and the text, Elkem should ensure that the information in all three locations is consistent.

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**XXI. DEFICIENCY TWENTY-ONE
POST-CLOSURE
RESPONSIBLE PARTIES**

During the review of Table 8-3, page 8-17, it was observed that the section on emergency contacts and telephone numbers is incomplete. From an emergency response perspective, Ohio EPA operates a Spill Hotline with On Scene Coordinators available to respond, investigate and oversee emergency cleanup activities 24 hours, 7 days a week. The telephone number is 1-800-282-9378. The focus is to minimize the impact of the environment from accidental releases, spills and unauthorized discharges from fixed or mobile sources. Incidents involving petroleum products, hazardous materials, hazardous waste, abandoned drum or other materials which may pose a pollution threat to the state's water, land or air should be reported immediately. Non-emergency complaints may be directed to Mr. Colum McKenna at NEDO. His number is (330) 963-1268. This portion of the plan should be revised to reflect this information.

**XXII. DEFICIENCY TWENTY-TWO
POST-CLOSURE
MAINTENANCE AND INSPECTION SCHEDULE**

OAC 3745-27-14(A)(4) requires quarterly inspections and a written summary of the following items during each year of the post-closure care period: leachate management system, the surface water management system, the groundwater system, the integrity and effectiveness of the cap system to include making repairs such as settlement, dead vegetation, subsidence, ponding, erosion, leachate outbreaks and run-of and run-off. Since the maintenance and inspection schedule in Table 8.1 does not concur with this rule, the schedule will need to be revised. The same deficiency was presented in the February 15, 2006 NOV / NOD letter, page 18 of 24, Deficiency 16.

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COMMENTS
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**I. COMMENT ONE
STORM WATER POLLUTION PREVENTION PLAN**

Upon review of the Table of Contents on page i, it was observed that the Stormwater Pollution Prevention Plan (SWP3) is being presented in Section 10.0 of the closure plan. Division of Solid and Infectious Waste Management (DSIWM) do not require SWP3 submittals in closure plans. As a result, I have forwarded the plan to Mr. Christopher Moody in the Division of Surface Water (DSW). Any future questions and/or comments should be directed to his attention at (330) 963-1118, or chris.moody@epa.state.oh.us

**II. COMMENT TWO
PROVISIONS OF THE ORDERS**

Section 1.4 of the plan is titled "Provision of the Orders" which described the technical evaluations utilized to determine characteristics that were instrumental to the negotiation of the DFFOs. In addition to this section, Section 5.0 is titled as "Attachments (Technical documents used in the negotiation of the Orders)".

Although this information played a role in preparation of the legal document, Ohio EPA recommends that Section 1.4, Section 5.0 and any other information referring to DFFOs negotiation be removed from the plan. At this stage of the process, the district office is responsible for conducting a technical review of the closure plan which will be governed by the solid waste regulations and the DFFOs. The settlement discussion iterations that led to the DFFOs are not relevant to the technical review process.

**III. COMMENT THREE
HYDROGEOLOGIC AND GEOTECHNICAL INVESTIGATION REPORT**

On page 2-4, it states that the above reports are located in a separate volume, dated June 2004. The revised closure plan should contain these reports.

**V. COMMENT FIVE
VARIANCES**

With respect to Section 2.0, "Variances", the first page has been labeled as 1-1. The first page of this section should be 2-1.

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**VI. COMMENT SIX
QA / QC PLAN
REFERENCE**

On page 6.1-2 of the QA / QC Plan, Sections 6.1.2.3 and 6.1.2.4, a reference is made to State Solid Waste Regulators. To be more specific, these sections should refer to Ohio EPA, Division of Solid and Infectious Waste Management (DSIWM), Northeast District Office (NEDO).

**VII. COMMENT SEVEN
QA / QC PLAN
QUALITY ISSUES**

On page 6.1.-3, Section 6.1.3.1.6, it states that the CQA Engineer is responsible for notifying the Owner and Engineer of all quality issues that arise during construction. The text should be revised to reflect that Ohio EPA-DSIWM-NEDO will also be informed of these issues.

**VIII. COMMENT EIGHT
QA/QC PLAN
PROGRESS MEETINGS**

With respect to progress meetings, the following is provided on page 6.1-6, Section 6.1.7.2: "...Progress meetings will held between the Engineer, the CQA Engineer, the Contractor, the Geosynthetic Installation Superintendent(s) and representatives from any other involved parties..." Ohio EPA-DSIWM-NEDO should be specifically added to this list. In addition, it is requested that the text be revised to include some language that meeting minutes will be prepared and distributed to the various parties.

**IX. COMMENT NINE
QA / QC PLAN
TABLE OF CONTENTS**

On page 6.1-6, Section 6.1.7.4 is titled "Problem or Work Deficiency Meetings." Since the table of contents (TOC) for the QA/QC Plan enumerates this section "6.1.7.3", the necessary change should be made.

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**X. COMMENT TEN
QA / QC PLAN
TYPOGRAPHICAL ERROR**

In Section 6.2.2, "Daily CQA Report", page 6.2-1, the second line of the sixth bullet has the following: "aad". Since this word should be "and", the necessary revision is requested.

**XI. COMMENT ELEVEN
QA/QC PLAN
PHOTOGRAPHS**

During the review of Section 6.2.7, "Final CQA Report", page 6.2-3, it was observed that the section did not contain any reference to photographs of construction activities. The revised plan should include this reference.

**XII. COMMENT TWELVE
QA / QC PLAN
SPECIFICATION CHANGES**

On page 6.2-3, Section 6.2.6, it states that the Engineer will notify the appropriate agency in the event of specification changes. Since Ohio EPA-DSIWM-NEDO is approving the closure plan, that agency should be contacted, at a minimum.

**XIII. COMMENT THIRTEEN
QA/QC PLAN
TYPOGRAPHICAL ERROR**

On page 6.2-3, the section for "Storage of Records" is numbered as "2.8". The proper reference should be "6.2.8".

**XIV. COMMENT FOURTEEN
QA / QC PLAN
ENGINEERED SUBBASE
TYPOGRAPHICAL ERROR**

At the top of page 6.3-1, the title of the section is "3.0 Engineered Subbase". The proper title is "6.3.0 Engineered Subbase".

**ELKEM METALS COMPANY
FINAL CLOSURE PLAN
NOTICE OF VIOLATION / DEFICIENCY
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**XV. COMMENT FIFTEEN
QA / QC PLAN
GCL-GM COMPOSITE
REPAIRS**

At the top of page 6.4-3, the following sentence is provided: "A patch measuring at least 12 inches larger than the defect in all dimensions." Since this sentence is incomplete, the necessary revision should be made.

**XVI. COMMENT SIXTEEN
QA / QC PLAN
GCL-GM COMPOSITE
OVERLYING MATERIALS**

Although Section 6.4.4.4, page 6.4-3, references Section 6.6 which is the drainage pipe information, the proper reference should be Section 6.5, "Vegetative Cover".

**XVII. COMMENT SEVENTEEN
QA / QC PLAN
VEGETATIVE LAYER
EROSION CONTROL MATERIALS**

Section 6.5.1, page 6.5-1, provides the following sentence: "The plan calls for vegetated liners within the channels (no rolled erosion control materials) but excelsior or straw mulch may be used in the channels." Later on this page in Section 6.5.2.2, rolled erosion controls products was listed as an erosion and sedimentation control. Elkem is asked to clarify this inconsistency.

**XVIII. COMMENT EIGHTEEN
QA / QC PLAN
AGGREGATES
OVERLAPS AND WATERSTOPS**

At the top of page 6.7-2, it is written that the appropriate overlaps and water –stops are shown on the construction plans. In addition to citing the plan sheet and the detail location, Elkem should explain the use of these geotextile applications.

**ELKEM METALS COMPANY
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**XIX. COMMENT NINETEEN
QA / QC PLAN
SOIL INTERFACE TESTING
TYPOGRAPHICAL ERROR**

In the introduction to Section 6.9, the following is provided: "This work mis-intended..." It appears that the beginning of the sentence should be: "This work is intended..."

**XX. COMMENT TWENTY
QA / QC PLAN
SOIL INTERFACE TESTING
NORMAL LOADS**

In Section 6.9.2.1, "Control Tests", the following sentence states "Normal loads for the testing will be established by the CQA Engineer; the normal loads will be low to reflect anticipated field conditions." Ohio EPA requests the specific loading that will be utilized in the interface evaluation.

**XXI. COMMENT TWENTY-ONE
SIDE SLOPE SEEPAGE REPAIR
REFERENCE**

On page 4-7, it is written that the details of the planned seepage area repair are presented in the construction plans (Drawing D1). Since the details of this repair are on Plan Sheet D3, the necessary change should be made.

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