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Ref: 8EPR-SR

September 26, 2013

Mr. David Gibby, Environmental Manager
US Magnesium, LLC
238 North 2200 West
Salt Lake City, Utah 84116

Re: US Magnesium Superfund Site, Rowley, Utah
Final Phase 1A Sampling and Analysis Plan

Dear Mr. Gibby:

The United States Environmental Protection Agency (EPA), US Magnesium, LLC (USMag) and Environmental Resources Management (ERM), contractor for USMag, have jointly participated in extensive discussions aimed at producing a plan for the investigation of the US Magnesium Superfund Site (the Site) located in Rowley, Utah. The EPA appreciates the level of effort USMag and ERM have expended in developing an appropriately scaled and scientifically robust initial investigation of the Site and the numerous comments and suggestions provided during the two formal and multiple follow-on scoping discussions.

In accord with Section 5.1.2, Development and Issuance of SAPs, of the Statement of Work (SOW) incorporated into the August 2011 Administrative Order on Consent (AOC) between USMag and the EPA, this letter transmits the EPA approved Final Phase 1A Sampling and Analysis Plan (SAP) for the Remedial Investigation (RI) and Feasibility Study (FS) at the Site. In addition to the SAP, this letter also communicates the EPA's responses to a range of comments and issues USMag and ERM raised during the scoping discussions. Specifically, the attachments hereto include:

1. EPA Response to ERM and US Magnesium May 21, 2013, Letter
2. EPA response to ERM June 6, 2013, Comment Letter
3. EPA Response to June 12, 2013, Memorandum Regarding PCB Method 680/8270 Analysis
4. EPA Responses to ERM Comments on May 2013 Draft Phase 1A SAP
5. Agency (EPA) Consideration of the RI/FS Process for Inner PRIs: 1, 3, 4, and 5-7
6. Final Phase 1A Remedial Investigation Sampling and Analysis Plan (CD)

Attachments 1 and 2, respectively, include responses to comments USMag and ERM raised in their May 21 and June 6, 2013, correspondence to the EPA, which focused on the scoping discussions and the EPA's summation of the outcomes of those discussions. Attachment 3 includes the EPA's response to ERM's June 12, 2013, proposal to use an alternate method for analysis of polychlorinated biphenyls (PCBs) at some portions of the site, which was largely resolved through the EPA's July 10, 2013, letter (also included with Attachment 3) to ERM approving the method pending suitable results from a Demonstration of Method Applicability (DMA) study. Attachment 4 includes detailed responses to ERM's June 29, 2013, comments on the Draft Phase 1A SAP, which the EPA issued on May 29, 2013.

Attachment 5 includes the EPA's consideration of an alternate approach for conducting the RI and FS at the Inner Preliminary Remedial Investigation areas (Inner PRIs), which include some of the most highly contaminated areas of the Site. This attachment lays out a number of requirements that USMag and ERM must meet in order to implement this alternate approach in lieu of the Phase 1A SAP at these PRIs, particularly with respect to the risk assessment process, and provides a timeline for completion of this alternate approach. Regardless of the approach taken, however, the range of remedial alternatives considered during the FS stage must address risks from all of the PRIs at the Site in an integrated fashion and result in a final site-wide remedy that is protective of human health and the environment.

Attachment 6 consists of a set of compact discs containing the Final Phase 1A SAP. As has been discussed with ERM, the EPA is issuing the SAP with the understanding that USMag and ERM will comply with all requirements contained in the SAP for notification and coordination with the EPA and the State of Utah Department of Environmental Quality regarding site access, mobilization and sampling and analysis oversight activities. Also, as discussed above and in Attachment 5, the path forward for the investigation of the Inner PRIs is dependent upon which approach USMag chooses for these areas and the schedule and requirements associated with each individual approach.

If you have any questions regarding this letter, please contact me at 1-800-227-8917, extension 312-6703, or you can call my direct line at 303-312-6703.

Sincerely,

Ken Wangerud
Remedial Project Manager,
Superfund Remedial Response Program

Attachments:

1. EPA response to ERM and US Magnesium May 21, 2013, Letter
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cc: David Abranovic, Project Manager, ERM
Chad Gilgen, Project Manager, UDEQ-DERR
Lindsay Ford, Esq., Parsons Bailey Latimer

ATTACHMENT 1

EPA Response to ERM and US Magnesium May 21, 2013, Letter

On May 21, 2013, ERM, on behalf of US Magnesium (USMag), sent a letter to the EPA raising issues for which ERM asserted mutual agreement was needed between ERM and the EPA, before the EPA's issuance of a site-wide Sampling and Analysis Work Plan. As background to ERM's letter and to this response, the EPA is providing an overview of the collaboration between the EPA and ERM since the effective date of the August 2011 Administrative Order on Consent (AOC) for Remedial Investigation and Feasibility Study (RI/FS) and the attached Statement of Work (SOW).

Overview of Collaboration Efforts

The scoping meeting to engage discussions for the first phase of site investigations (as called for under the AOC/SOW) was held November 28-30, 2011. At that time the EPA accommodated ERM's request for an additional scoping meeting, which was held April 17-20, 2012. These discussions were followed by additional technical focus meetings and teleconferences throughout 2012 to engage the range of technical complexities confronted at this Site. During the April scoping meeting, the EPA agreed to ERM's proposal to initiate site investigations under a Phase 1A sampling plan focusing on identifying chemicals of potential concern (COPCs) in eighteen (18) preliminary remedial investigation areas (PRIs), along with surveys to gain information about receptor exposure. It was further agreed that ERM would develop a work plan and initiate testing of field sampling methods and laboratory analyses in a Demonstration of Methods Applicability (DMA), with DMA findings to contribute to final-specifications for the site-wide Phase 1A Sampling and Analysis (SAP) work plan that the EPA would begin to develop. It was hoped that site-wide field investigations could begin in 2012. The completion of the DMA and engagement of technical issues (as noted in the Final SAP) continued into 2013, as the EPA strived to complete preparation of the site-wide Phase 1A SAP; the EPA and ERM each recognized and agreed it was important to commence site sampling in 2013.

As the EPA pressed to bring closure to the scoping meetings and issue, by the end of May (for ERM's comment), the initial site-wide sampling and analysis work plan, ERM transmitted a letter on May 21, 2013, raising issues regarding the scoping process that ERM contended required resolution prior to the EPA's issuance of the Draft Phase1A SAP. The same day, Lindsay Ford (Parsons Behle & Lattimer (PBL), counsel for USMag) sent a letter to the EPA seeking postponement of the issuance of the Draft Phase 1A SAP, until the issues being registered by ERM could be resolved. Discussions ensued between the EPA Legal-Enforcement Program and PBL to schedule a meeting regarding ERM/USMag concerns.

Given the extensive scoping discussions that had been carried out, the EPA was aware of the range of ERM's issues concerns and gave them full consideration in the development of the Draft Phase 1A SAP. Therefore, in accordance with provisions of the AOC/SOW, and in order to maintain progress towards initiating site-wide investigations in 2013, the EPA issued the Draft Phase1A SAP on May 23, 2013 for ERM's review and comment.

Accordingly, the EPA responses to the May 21 letter are included below and address the following areas of concern raised by ERM:

- Scoping process pursuant to the AOC-SOW;
- PCB Method 1668 analysis and proposed Modified Method 680/8270-SIMS;
- TQLs and DLs for PCBs;
- Revising the approach to identifying COPCs and instead implement the Phase 1B of RI/FS work for PRIs 1-4-5-6-7;
- Questioning the need for deep sediment cores within waste lagoons;
- Methods for obtaining deep-sediment cores;
- Post-DMA analytical methods adjustments; and
- Technical oversight review of AERMOD dispersion modeling.

EPA Responses to ERM/US Magnesium Comments

1. **ERM/US Magnesium Comment**
   We understand that EPA intends to issue a draft Phase 1A RI Sampling and Analysis Plan (SAP) as early as next week; however, we do not believe that the intent of the scoping process, as described in Section 5.1.1 of the Administrative Settlement Agreement and Order on Consent (AOC), has been met, and do not agree with several aspects of the scope of work (SOW) described in the EPA-Approved Summary of Phase 1A Scoping Discussion. Therefore, pursuant to the aforementioned section of the AOC, we do not feel that it is appropriate that the draft Phase 1A SAP is issued until these concerns are addressed and resolved.

   The scoping process was negotiated and incorporated into the AOC to provide US Magnesium the opportunity to work jointly with the EPA to develop the remedial investigation (RI) SOW. This was a significant point of discussion during the AOC negotiations, with the scoping process serving as the basis for US Magnesium ceding the drafting of the SAP to EPA. While we had the understanding that we may not agree on all technical aspects of the RI approach, we further understood that there would be ample time to fully evaluate each issue raised to the satisfaction of both parties. ERM/US Magnesium and EPA worked collaboratively through many technical issues. However, we believe the following issues have not been adequately addressed and must be further evaluated and resolved prior to EPA issuing the draft Phase 1A SAP.

EPA Response: ERM/US Magnesium's comments suggest that the August 4, 2011, Administrative Order on Consent (AOC) requires the EPA and ERM/US Magnesium to agree upon any work to be performed under the AOC and accompanying Statement of Work (SOW). Such is not the case. The AOC sets forth a framework on which the EPA and ERM/US Magnesium are to work together to achieve the goals of the AOC, i.e. to identify the constituents of potential concern at the Site, the nature and extent of contamination and, ultimately, to determine the degree of risk that Site contamination may pose to human health and the environment. And, while the EPA entered into the AOC with the intention of working closely with US Magnesium and ERM, for the reasons set forth below, final decision making authority on the elements of work under the AOC remains with the Agency.

Section 104 of CERCLA authorizes the President to respond to releases of hazardous substances. That authority has been delegated to the Administrator of the EPA and by law cannot be delegated further to a private party, or to states or tribes.

The extent to which a private party can participate in a CERCLA remedy is generally set forth in CERCLA section 122, concerning agreements. Section 122(a) promotes such agreements as long as the President determines that the private entity's involvement is done "properly" and complies with the National Contingency Plan (NCP). The NCP sets forth procedures for responding to releases of hazardous substances, and these regulations require EPA to be the final decision maker for CERCLA remedies[1].

Paragraph 9 of the AOC states that, all work to be done under the AOC is subject to approval by the EPA. Under AOC paragraph 39, EPA can approve, disapprove or modify a plan, report or other item the Respondent is required to submit.

Paragraph 34.c of the AOC (Modification of the SOW and SAPs) states that "EPA may determine that in addition to tasks defined in the SOW, other additional Work may be necessary to accomplish the objectives of the RI/FS." Respondent agreed to perform those response actions, in addition to those set forth in the SOW.

Under Section III, paragraph 8.b, of the AOC, nothing in the AOC can limit EPA's authority to take response actions at the Site.

In addition to the authorities under CERCLA and the NCP, the EPA has, pursuant to Section 5.1.1 of the AOC-SOW, worked extensively for the past twenty (20) months with US Magnesium's contractor ERM to discuss approaches to the investigations to ensure that the work to be carried out is adequate to achieve project specific goals. However, the close and collaborative nature of the EPA's work with ERM/US Magnesium should not be misinterpreted as a requirement that the EPA and ERM/US Magnesium must agree upon the elements of work required under the AOC and SOW.

2. **ERM/US Magnesium Comment:**
   ERM proposed modified EPA Method 680 during the post-Demonstration of Method Applicability (DMA) analytical discussions as an alternative to Method 1668. This was proposed not only as an important measure for substantially reducing costs, but also to resolve the significant performance issues identified during the DMA with Method 1668. As clearly demonstrated during the DMA, the use of a high-resolution analytical method like Method 1668 to analyze high concentration samples creates numerous technical and data quality challenges. For example, the serial dilutions required to bring the samples into the working range of the methods may dilute out the internal standards, calling the overall data quality into question. Although it may be possible to mitigate some of the technical issues associated with using Method 1668 in these areas with method modifications, doing so will add considerable cost to the RI with no benefit. ERM introduced Method 680 during the 4 April 2013 Chemistry/Analytical Conference Call and has since, in response to EPA questions, committed to provide EPA a comprehensive technical package to support the use of modified Method 680. We believe that the concerns raised by the EPA risk assessors with regard to the *"potential limitations with this method for complete and accurate identification of all WHO PCB-*

[1] A decision by the President not to enter into an agreement or otherwise not to use the procedures under section 122 is not subject to judicial review.

congeners" are not supported by fact-based technical evidence and can be adequately addressed through the review of the forthcoming technical package. In addition, ERM has offered to conduct a site-specific study that would include a side-by-side comparison of Method 1688 and modified Method 680 by analyzing the DMA samples currently in frozen storage. We believe that this evaluation will address EPA's concerns, can be done quickly (within 4 to 6 weeks) and, as EPA suggested, can be included in the DMA-like study. We believe that this evaluation must be completed prior to initiation of the Phase 1A work to realize the full benefit of modified Method 680, and avoid using Method 1668 for analysis of samples that clearly exceed the working range of the method and add unnecessary costs to the RI.

EPA Response: EPA Method 1668 is an analytical procedure developed by the EPA for use under the Clean Water Act. The method is considered state of the art for detection of low concentrations of individual PCB congeners in water, wastewater, soils sediments, biosolids and tissues. Method 1668 has undergone a peer reviewed, interlaboratory validation study and is routinely performed by numerous laboratories, including the EPA's contract laboratory program, to support many Superfund sites across the country.

The EPA disagrees with ERM's statement that "significant performance issues" were identified during the Demonstration of Methods Applicability (DMA) that was performed on samples from the US Magnesium site in the Fall of 2012. All analytical methods are subject to sample matrix interferences and modification due to high concentrations of analytes commonly occurs at hazardous waste sites.

The EPA agrees with ERM's former position that Method 1668 provides "definitive data suitable for use in risk assessment" as stated in ERM/US Magnesium's *Draft Laboratory Demonstration of Method Applicability Technical Memorandum for Soil, Sediment, Waste, and Water (January 2013).* In Section 6.0 of that memorandum, ERM stated:

> *"... ERM concludes that the analytical methods employed during the DMA investigation have been demonstrated to provide definitive data suitable for use in risk assessment, and that the proposed analytical methods will be suitable for use during the US Mag Phase 1 investigations (in some cases, with implementation of non-routine preparatory and analytical techniques)"*

As a cost saving measure in April 2013, ERM/US Magnesium proposed using a modified Method 680 for analysis of PCBs as an alternative to Method 1668. Modified Method 680 reportedly has a significantly higher detection limit than Method 1668, is to our knowledge only performed by one laboratory in the United States, was only recently (Dec 2012) *partially* accredited and has not been tested for use with complex sample matrices from the US Magnesium site. Despite ERM/US Magnesium's repeated indications that it would provide a technical package to the EPA that would allow evaluation of the utility of this method, ERM/US Magnesium did not provide fundamental information such as homologue calculation procedures and frequency of internal standards to the EPA until June 12, 2013. Furthermore, ERM/US Magnesium asserted that the SOP, a required component of *all* federal government Quality Assurance Project Plans, was being protected as confidential business information by the only lab that performs the analyses. It would be *highly* unusual for the EPA to accept an analytical method without access to such basic supporting documentation.

Almost 3 ½ months after the modified Method 680 was proposed by ERM/US Magnesium and almost 3 weeks after the draft phase 1A SAP was issued, EPA received the complete technical documentation needed to evaluate the modified Method 680 and correspondence indicating there was no CBI claim on the SOP.

The EPA has always expressed willingness to minimize investigation costs and supports such efforts where proposed cost-saving measures meet the data quality objectives to which both parties have agreed. As such, EPA reviewed the supporting technical documentation and provided a detailed response to ERM's request to use Modified Method 680 under separate cover prior to the issuance of this response letter.

In order for the EPA to approve the use of modified Method 680 for this Site, a demonstration of the method's performance with Site media will be required. As with all documents developed under the AOC, the EPA must approve a written work plan that provides sufficient detail to evaluate the method prior to its use in Site investigations. The EPA agrees with ERM/US Magnesium's 4-6 week timeline for evaluation of the modified Method 680. The evaluation would need to be completed prior to the initiation of the 2013 field season for inclusion in any aspect of the Phase 1A SAP work plan.

Assuming the method achieves its reported quantitation limits (QLs), it is still very unlikely that it can fully meet the Target Quantitation Limits (TQL) needed for risk assessment for all PRIs (see the EPA response to ERM/US Magnesium Comment # 3). Therefore, modified Method 680 will only be considered for use in the most highly contaminated samples where, because the method is less sensitive than Method 1668, non-detects are less likely to occur. Should non-detect results occur with modified Method 680, re-analysis with Method 1668 will be required.

As noted in EPA's July 10, 2013 letter, the EPA encourages ERM/US Magnesium to develop a brief DMA workplan amendment and description of how this modified Method 680 will be applied. The EPA will evaluate the proposal and DMA results for potential inclusion in the Phase 1A SAP work plan.

3. **ERM/US Magnesium Comment:**
   The EPA has raised the concern of not having adequate detection limits for the PCB WHO congeners; however, both EPA and ERM agree that the current Target Quantitation Limits (TQLs) are likely overly conservative. ERM has tried to engage the EPA in a process to refine the TQLs such that they more appropriately represent site conditions. Clearly, it is not possible to determine the adequacy of an analytical method if the required TQL is not known; therefore, ERM believes that it is essential to refine the PCB TQLs such that the adequacy of modified Method 680 can be determined. ERM developed an Excel workbook designed to evaluate revisions to the PCB TQLs and support the selection of an appropriate analytical method (sent to EPA on 12 April 2013). EPA did not provide comments on this submittal, and we believe that this discussion must proceed to a logical conclusion prior to the final selection of a Phase 1A analytical method for PCBs. ERM believes this process can be accomplished quickly, within 4 to 6 weeks.

EPA Response: As stated above, Method 1668 can provide data suitable for risk assessment in all areas of the US Magnesium Superfund site. The EPA and ERM/US Magnesium have jointly and independently evaluated the current Target Quantitation Limits (TQLs) and reached the same conclusion: Method 1668 achieves the necessary quantitation limits in solid media and is

closer than all other practical methods to achieving the necessary quantitation limits in aqueous media.

The EPA evaluated ERM/US Magnesium's Excel workbook and memo dated 12 April 2013, which proposed a refinement of TQLs to less conservative values to accommodate a less expensive PCB analytical method (modified Method 680). The EPA proposed a standing bi-weekly risk assessor meeting to ensure this issue (and others) were addressed in a timely manner and fully vetted by ERM/US Magnesium, EPA UDEQ and the Natural Resources Trustee staffs. The topic of TQLs and the appropriate PCB analytical method was discussed at several of these meetings and the EPA clearly stated it does not believe that modified Method 680 quantitation limits are sensitive enough to adequately detect contamination in areas of low PCB concentrations.

The information provided in the 12 April 2013 ERM/US Magnesium memorandum reaches the same conclusion:

> *"As can be seen when reviewing the TQL assessment tool, Method 680 has adequate DLs for the homolog groups and most of the coplanar congeners (with the exception of PCB-77, 81, 126 and 169) in solid media. Only Method 1668 from Test America has DLs that are less than all of the TQLs for the individual coplanars. For the aqueous medium, neither method 680 or 1668 has adequately sensitive DLs based on the proposed TQL."*

The specific PCB congeners for which Method 680 has inadequate Detection Limits (DLs) in solid media are the very congeners that have the highest Toxicity Equivalency Factors (TEF) and are therefore, by orders of magnitude, the most toxic PCB congeners. Method 1668 is more likely to detect these most toxic congeners than Method 680. The EPA believes the superior detection limits of Method 1668 in solid media alone are sufficient reason to necessitate the use of Method 1668 in areas of lesser contamination.

For aqueous media, the EPA recognizes that while neither method can fully achieve the necessary QLs for all congeners, Method 1668 produces analytical data that are closer to the required TQLs and will therefore reduce the uncertainty in interpreting the evaluation of risk associated with these most toxic PCB congeners. Therefore, Method 1668 will help the EPA more accurately assess the potential risks to human health and the environment posed by PCB contamination at the Site in both solid and aqueous media.

The EPA recognizes that PCB data collected during Phase 1A will be used, presumably with additional data as determined necessary, in the Baseline Human and Ecological Risk Assessments. The exact use of these data will not be known until ERM/US Magnesium completes, and EPA approves, the Risk Assessment Technical Memoranda (i.e., Work Plans) as required by the AOC.

It is likely however that some degree of modeling of ecological receptor exposures to PCBs via the food chain will be required to efficiently evaluate certain exposure scenarios, and to determine the degree of risk these PCBs pose to the environment. To perform these modeled exposure scenarios it is necessary to have QLs that will accommodate these assessments. As

discussed in the 25 April 2013 risk assessors teleconference, EPA has evaluated several modeled exposure scenarios and obtained results that lead to conclusions consistent with those presented in ERM/US Magnesium's 12 April 2013 memo. The reported QLs for Method 680 do not meet the TQLs for the most toxic PCB congeners in solid media while those for Method 1668 do. In aqueous media, while neither method is fully capable of meeting the TQLs, Method 1668 can achieve results closer to the TQLs, which will reduce the uncertainty associated with interpretation of non-detect results.

The EPA recognizes that Method 1668 may cost more than Method 680 but, given the QLs associated with the modified Method 680 and the potentially serious health effects associated with the uncontrolled release of these toxic chemicals to the environment, Method 1668 is necessary to properly assess potential risks to human health and the environment in samples with lesser levels of contamination.

4. **ERM/US Magnesium Comment:**
   ERM asked the EPA during the post-DMA working meeting held on 20 February 2013, as well as during subsequent conversations with the EPA Project Coordinator, to consider a process for selection of chemicals of potential concern (COPCs) in the high concentration areas that focuses on the data requirements to retain COPCs. EPA and ERM agreed to limit the Phase 1A RI Data Quality Objective (DQO) to COPC selection required for the Baseline Risk Assessment, and data collection required to determine nature and extent would be deferred to Phase 1B of the RI (Scoping Session 2 Outcome Memorandum submitted to EPA via e-mail on 10 May 2012). Based on the DMA data collected from Preliminary Remedial Investigation (PRI) areas 1, 4, 5, 6, and 7, it is unlikely that any chemical classes can be screened out during Phase 1A. Although it is possible that some obscure COPCs could be screened out, given the likelihood of elevated detection limits, this is far from certain and not worth the significant data collection costs. Additional data collection in these areas may be necessary for future RI and risk assessment purposes; the collection of additional samples for the purpose of COPC selection is not warranted at this time.

EPA Response: Skipping the selection of chemicals of potential concern step in the risk assessment process will not save time or money over the course of the project and will likely inject significant uncertainty into the design of subsequent phases of data collection.

The EPA risk assessment guidance for COPC selection focuses exclusively on eliminating chemicals that the EPA is confident do not pose an unacceptable risk to human health or the environment. Retained chemicals are further evaluated in the baseline risk assessment to determine if they truly pose an unacceptable risk. For ecological risk assessment, the baseline risk assessment refines the problem formulation based on the receptors (plants and animals) on Site, mechanism(s) of toxicity and fate and transport of chemicals identified in the COPC selection process. This information is used to determine what ecological receptor groups are at risk (assessment endpoints) and what focused measurements (measurement endpoints) are needed to accurately assess risk to those receptors. Specific chemicals can cause specific effects on specific receptors. To adequately assess environmental risk one must measure specific endpoints.

By deviating from the established ecological risk assessment process and skipping the COPC selection step, the risk assessment sampling would likely require either collecting a large amount of potentially unnecessary data to adequately address all possible receptor/chemical combinations or resort back to a phased approach that would require a step very similar to COPC

selection to focus data collection. The former option would result in additional expense associated with unfocused measurement endpoint data collection. The latter option, performed as part of Phase 1B will likely result in an unnecessary delay of a year or more.

ERM/US Magnesium's expectation (based on the very limited data collected during the DMA) that it will not be possible to eliminate entire chemical classes from further evaluation during the COPC selection process for the named PRIs may or may not be true. The EPA however, considers it possible that a number of chemicals may be eliminated from further consideration thus reducing costs for subsequent sample analysis.

For these reasons the EPA believes that it is most efficient and cost effective to follow the standard ecological risk assessment sequence. This means that data needed for identification of COPCs will be evaluated first, followed by the collection of any additional data that may be needed to reliably characterize the nature and magnitude of risks to ecological receptors. EPA does not believe there are conditions at the US Magnesium Site that warrant significant deviations from established risk assessment methods and believes this approach will result in unnecessary expense and delay any potential risk reduction measures determined necessary for the Site.

5. **ERM Comment:**
   The rationale for collection of "deep sediment" samples from the active waste lagoons (PRIs 5 and 6) has not been fully evaluated. EPA has stated that these samples are necessary to assess the chemical composition of "early-era" wastes and evaluate COPCs representative of submerged geochemical conditions; however, EPA has not provided a detailed explanation of why it believes the composition of the "early-era" waste may be significantly different than the current waste stream. Given that the manufacturing processes at the facility have been consistent since it began operation, with only minor changes in electrolytic cell technologies, there is no valid reason to suspect that previously unidentified classes of COPCs might have been generated in the past. The facility has produced magnesium from concentrated brine from the Great Salt Lake since it was established, and has always generated the same waste stream. Furthermore, it is not necessary to collect samples of submerged sediment in the active waste lagoons to assess the COPC makeup of "early-era waste-sludge deposits," since the readily accessible sediment within the inlet area of the old waste pond (PRI 7) represents the waste stream from the initiation of operations to approximately 1986. If the EPA technical team has any specific information to support the assertion that there may be geochemical or redox conditions in submerged sediments that have the potential to create unique COPCs not present in surface sediment, please provide a detailed explanation. Due to the recalcitrant nature of most of the COPCs associated with this site, ERM's technical team is unaware of any subsurface conditions or specific chemical reactions that could produce a unique suite of COPCs in subsurface sediment, other than perhaps the pH and redox reactions associated with select species of metals. It appears that the EPA's primary rationale for collecting these data is to prevent erroneously screening out COPC-based surface sediment data. This is highly unlikely because, as stated above, it is improbable that any chemicals will be screened out as COPCs in the ditches and active waste lagoons. If it is EPA's intent to use these data to evaluate the vertical distribution or "COPC makeup," we do not believe these data are necessary to achieve the Phase 1A DQO and can be included in subsequent phases of the RI if necessary. ERM has asked the EPA to provide a fact-based technical justification for the collection of these data and to date has not been provided adequate explanations.

EPA Response: The EPA requires subsurface sampling because, due to conditions at the Site, sampling only surface soils may fail to identify certain COPCs in deeper sediments. Site conditions include:

- *The types of chemicals released in the past are different than at present*. ERM/US Magnesium has provided the EPA with a description of various changes in the production processes that have occurred over time; therefore, it is difficult to conclude with certainty that no change in chemical types has occurred. If the magnesium production process has remained sufficiently similar between earlier and recent times, such that the nature of contaminants is constant, subsurface sampling should confirm this and confirm an accurate COPC selection. .

- *The level (concentration, mass loading) of contaminants was higher in the past than at present*. Even if there has been no change in the types of contaminants released by plant operations over time, it is possible that the amount of contaminant release has changed over time. Information from ERM/US Magnesium shows that various improvements in plant operations have occurred in the past, some of which have resulted in decreased release rates of contaminants to the environment. If so, a COPC may be erroneously excluded if levels of a contaminant in surficial (recent) sediments are below a level of concern, while concentration levels of the same contaminant in deeper sediments are above a level of concern.

  ERM/US Magnesium claims that the characteristics of all "Early Era" waste, at least prior to 1986, when PRI 7 was abandoned, can be determined simply by analyzing the PRI 7 inlet surface sediments. The EPA does not assume that plant conditions can be stratified into only "early era" (pre 1986) and "modern era" (post 1986) conditions, since information provided by ERM/US Magnesium shows there were substantial changes in plant facilities implemented around 2000.

6. ERM/US Magnesium Comment:

The EPA-Approved Summary of Phase 1A Scoping Discussion states that the *"floating-dock"* tested by ERM during the DMA was not effective, and that the EPA has pointed out other methods that could be successfully employed. This is not a factual statement, and in fact the methodology suggested by EPA of using *"shallow-draft flat-bottom boats"* that could be "*triangularly tether-winched across the lagoons"* as well as the deployment of an "*amphibious mud-buggy"* are hypothetical and not considered by ERM to be practical nor safe for the field personnel conducting the work. Even if these methods were considered viable, they would need to be thoroughly tested prior to inclusion in the Phase 1A SAP. If the need to collect samples from inaccessible, submerged areas of the active waste ponds is established, the support for which is requested in the previous bullet item, ERM will evaluate additional methodologies for collecting these samples as part of a DMA-style evaluation. Without further evaluation and discussion on this issue, it is arbitrary for the EPA to unilaterally decide to include this work in the Phase 1A SAP.

EPA Response: The primary Phase 1A data quality objective is to collect data of sufficient quantity and quality to determine the chemicals of potential concern. To meet this objective, EPA developed a statistical test to determine, with a 95% probability, the number of samples required to ensure that the high end of chemical concentrations are captured in the Phase 1A results for any given PRI. An underlying assumption that must be met to maintain the validity of the statistical basis for the number of samples needed is that the samples are collected from random locations within a study area (PRI) or from a grid with a random start. Violation of this assumption invalidates the study design.

The EPA has stated since the first scoping meeting that samples are needed from all PRIs to meet the data quality objectives jointly developed with ERM/US Magnesium. This includes areas that are inundated with water. Moving sample locations to areas of greater convenience will negate the validity of the statistical sampling design that ERM/US Magnesium agreed to and thus will not meet the primary Phase 1A objective.

ERM/US Magnesium indicated an intention to obtain a floating-dock with safety hand-rails to test during the DMA for sediment and water sampling in lagoon areas. If ERM/US Magnesium believes that the floating dock remains a viable option to collect these samples, ERM/US Magnesium should continue to pursue its use during the Phase 1A data collection. If ERM/US Magnesium would like to develop alternative methods between now and the implementation of the Phase 1A SAP, the EPA would be willing to discuss those alternatives. If ERM/US Magnesium decides it is unable or unwilling to collect the necessary samples, then the EPA can make arrangements for collection of the samples.

7. **ERM/US Magnesium Comment:**
   ERM submitted a draft Phase 1A Laboratory DMA Technical Memorandum for Soil, Sediment, Waste, and Water in January 2013. This document identified numerous technical issues associated with several laboratory methods tested in the DMA (including the PCB Method 1668) and was prepared to provide the information necessary to design the Phase 1A analytical program. EPA chose not to provide ERM with specific comments on this document and instead held a scoping meeting on 20 February 2013. Rather than engaging in a discussion of all the DMA results, the EPA team focused on EPA split data results to make conclusions regarding the Phase 1A analytical program. This one-sided process ultimately resulted in the issuance of the EPA Post DMA Modifications for Phase 1A Sample Processing and Analytical Methods Technical Memorandum (transmitted to ERM on 25 March 2013). This memorandum made it clear that the EPA team was also uncertain about how to address the technical challenges associated with analysis of samples collected from the high concentration PRIs. After further discussion and exchanges of information (4 April 2013 teleconference and 18 April 2013 e-mail from Kevin Lundmark) many of the EPA-suggested modifications, specifically those for PCB analysis, were determined not to be appropriate. The discussion regarding use of modified Method 680 for PCB analysis was initiated at this time. Clearly this was not "late in the planning process," but a normal outcome from the technical issues identified during the DMA. It is unacceptable for the EPA to suggest that there is insufficient time to resolve this issue and that Phase 1A must proceed without a full evaluation of the appropriate analytical methods. As stated above with respect to PCB sampling, the method EPA appears poised to specify, Method 1668, not only is significantly more costly than modified Method 680, but is not a suitable method in the high concentration areas because the concentrations in these areas clearly exceed the working range of the method.

EPA Response: The history of the scoping process, discussions regarding analytical methods and other facets of this project entered into by the EPA and ERM/US Magnesium show that this process has been far from one-sided.

At the meeting in Salt Lake City on 20 February, 2013, the EPA engaged in discussions of <u>both</u> the results of EPA's split-sample results and ERM/US Magnesium's analyses. Potential revisions to the Phase 1A analytical program were not extensively discussed in the February 20, 2013 meeting; however, in a follow-up conference call held on March 6, 2013, ERM/US Magnesium proposed revisions to the Phase 1A analytical program and the EPA agreed with the majority of them. ERM/US Magnesium made no mention of using a modified method 680 for congener specific analyses at this time.

Specific issues and suggestions concerning analytical methods were raised by the EPA in a memorandum prepared and sent to ERM/US Magnesium on March 25, 2013, which included the following topics:

- Analytical and preservation method options for volatile organic (VOC) analyses, primarily in ditch samples
- Screening methods that could be employed for identification of samples with high concentrations of PCBs to minimize sample processing and reduce costs,
- Suggested methods to reduce reporting limits for select semivolatile organic (SVOC) chemicals
- Sequential analyses for perchlorate in soil and the reason for observed discrepancies in perchlorate results between EPA and ERM/US Magnesium labs
- Alternative methods for hexavalent chromium analyses

As ERM/US Magnesium indicates, further discussion and exchanges of information (4 April 2013 teleconference and 18 April 2013 e-mail from Kevin Lundmark) led to the following decisions on the topics from the EPA memorandum:

- EPA agreed that the suggested VOC method is not readily available but may be worth using in future sampling events. ERM/US Magnesium agreed with the EPA's suggested sample preservation methods; using both the Encore samplers and methanol-extraction methods in the field could improve data quality for VOC samples.
- ERM/US Magnesium chose to not use the screening analysis of PCBs to identify samples of high concentration.
- ERM/US Magnesium agreed with the EPA's suggested method alternatives for select SVOC analysis.
- ERM/US Magnesium agreed with EPA's suggestion that the sequential analysis of soil samples for perchlorate followed by confirmation as necessary was an analytical and cost savings measure.
- EPA had suggested alternative analytical methods for evaluation of hexavalent chromium which were adopted by ERM/US Magnesium.

The possibility of using a modified Method 680 was introduced during the discussions, on April 4, 2013, and it was agreed that ERM/US Magnesium would provide basic information on the specifics of the method for EPA evaluation. However, as stated above in the EPA's response #2, the Agency did not receive a full technical package from ERM/US Magnesium until 6/12/13, about 3 ½ months after the initial discussion of this method and almost 3 weeks after EPA issued the draft Phase 1A SAP. Additionally, during this 3 ½ month interim, ERM/US Magnesium asserted that the lab that developed the modified Method 680 was claiming the SOP was confidential business information, thus complicating the EPA's ability to enlist appropriate expertise to review the document. Any delays in the potential inclusion of the modified Method 680 into the phase 1A SAP were due to ERM/US Magnesium's inability to provide the required information to the EPA.

An additional part of the modified Method 680 evaluation was to determine if the method detection limits were adequate to meet data quality objectives and if Target Quantitation Limits

(TQLs) could be revised. The EPA fully participated in evaluating the revision of TQLs (see the EPA response #3 above) and concluded that modified Method 680 quantitation limits are generally inadequate for ecological risk assessment purposes but could be used only in areas of high contamination, assuming PCBs were detected. If PCBs were not detected, then the sample will need re-analysis with Method 1668.

As the EPA has repeatedly indicated, if ERM/US Magnesium can successfully demonstrate modified Method 680's applicability to site media in a timely manner, then this method may be applicable for analysis of samples from areas of high contamination. The method does not have reported method detection limits low enough to be applied in areas outside the most contaminated PRIs.

8. **ERM/US Magnesium Comment:**
   ERM presented a detailed study design for the Phase 1A monitoring program based on AEROMOD of COPC distribution using standard industry air modeling methodology. EPA then requested, without providing any technical justification, that ERM redo the work using a 250-meter grid versus the 1,000-meter grid. This work was completed and submitted to EPA via e-mail on 18 March 2013. This additional work clearly demonstrated that there was no material difference between the 250-meter and 1,000-meter grid analysis. Rather than accepting these results, the EPA decided to redo the modeling work to verify the results. This entire exercise resulted in the EPA selecting monitoring locations for the Phase 1A SAP not appreciably different from the locations originally proposed by ERM, demonstrating that the entire exercise was unnecessary. This type of excessive oversight and duplication of effort is not only escalating the cost of the RI, but is also resulting in significant project delay.

EPA Response: Oversight and review of work done by a responsible party is a necessary and appropriate role for the EPA, whether or not the EPA's oversight identifies any errors in the responsible party's work, and whether or not any changes in sampling design occur as a result. In this case, the EPA's independent work did in fact: (a) identify an apparent error in ERM/US Magnesium's work, (b) present significant new information not included in ERM/US Magnesium's work, and (c) result in several necessary changes in the air sampling design.

The request from the EPA to ERM/US Magnesium (dated 26 January 2013) for AERMOD to perform new calculations using a 250-meter grid spacing was based on knowledge within the EPA's Technical Air Program that: (1) maximum pollutant concentrations generally occur within 300 meters of the source, and (2) the distribution of the pollutant concentrations can vary significantly over a spatial scale as small as 50 meters.

Therefore, to better understand the distribution of emissions from the US Magnesium facility and better determine the most probable location of "peak" concentrations across the Site, the EPA requested a "denser" receptor grid, especially near the operating facility. The EPA received ERM/US Magnesium's 250-meter grid analysis on 27 March 2013. However, the results were presented using ERM/US Magnesium's statistical protocol for ranking the suitability of sampling locations, rather than using the statistical protocol specified by the EPA for evaluating the AERMOD results in its 26 January 2013 request to ERM/US Magnesium. For this reason, EPA determined it was necessary to independently perform the calculations using EPA's specified statistical protocol.

In the intervening period, the EPA had been working to validate ERM/US Magnesium's AERMOD work and to perform new, necessary tests not performed by ERM/US Magnesium. The first of the EPA's findings was an indication of an error by ERM/US Magnesium in the post-processing of the AERMOD results. Specifically, the EPA found that a plot of Site-wide average concentrations versus month was not identical with results provided by ERM/US Magnesium. Based on the EPA's independent calculation, maximum Site-wide average concentrations appear to occur in December and January, rather than in November and December. This is important because sampling in the optimum time window increases the probability that the data set collected will be adequate to meet the Data Quality Objectives for the project.

Additionally, because multiple sources of airborne emissions exist on the Site (i.e., stack and fugitive emissions), each of which could potentially pose risks to human health and the environment, the EPA determined that investigation of pollutant concentrations originating from each source, separately, was necessary. The result of the EPA's independent analysis was that both the magnitude and location of "Cbar-max" (the highest long-term average relative concentration at any location on-site) depend strongly on the assumed ratio of release rates from stack and fugitive sources. ERM/US Magnesium's calculations were performed for only one assumed value (stack = 2, fugitive = 0.02). Because the true ratio of release rates is not known and may in fact vary substantially over time, the EPA concluded that it was necessary to model the releases from each source separately.

The primary effect of this change is a revision of the expected probabilities of samples exceeding Cbar-max at each station (calculated using the EPA's statistical approach rather than the more complex and less direct approach used by ERM/US Magnesium). Based on the results of this approach, the EPA identified sampling locations that are optimal for characterizing stack releases *and* fugitive releases. This approach ensures that sampling stations will capture emissions from each type of release source and the placement of these stations is not subject to uncertainty due to lack of data on the true relative release rates.

The EPA found that the optimum locations for characterizing stack releases were all in the foothills, and were generally similar to the locations previously identified by ERM/US Magnesium. This is not unexpected, since the calculations performed by ERM/US Magnesium assume that nearly all (99%) of the total release was from the stack. However, the locations of stations needed to characterize *fugitive* releases were substantially different from ERM/US Magnesium's proposal. Rather than having two stations located between 1,400 and 4,300 meters to the south and east, the revised calculations indicated the optimum locations for assessing fugitive releases was just outside the boundary of the operating facility, one due south and one to the northwest.

The EPA does not consider these changes to be "not appreciably different." As noted above, even if the EPA's work resulted in no changes, that would not mean the evaluation was unnecessary.

With regard to the claim that the EPA's request to ERM/US Magnesium and/or the EPA's own analyses has caused delay, the EPA strongly disagrees. EPA first began requesting AERMOD

files from ERM/US Magnesium in November 2012. However, ERM/US Magnesium did not provide sufficient data to allow EPA to begin work until 25 March, 2013 (almost 5 months later). In addition, the time lag between the EPA's request (dated 26 January, 2013) for 250-meter results and ERM/US Magnesium's submittal of the results (received by the EPA on 27 March, 2013) was approximately 2 months. Thus, the total delay in the process introduced by slow responses by ERM/US Magnesium was approximately 7 months. In contrast, once ERM/US Magnesium provided the necessary files, the EPA completed all of the supplemental work (all based on a 250-meter grid spacing) in approximately 3 weeks (by 18 April 2013).

[Follow-up note to EPA response above:
The EPA AERMOD calculations described above were the basis for the Phase 1A air sampling design presented in the May 23 draft Phase 1A SAP. Since that time, EPA has conducted additional AERMOD calculations to further investigate the optimum times and locations for sampling. Rather than assuming that the optimum sampling time would be equal to the time when the site-wide average concentration was highest, EPA evaluated the probability of random samples exceeding Cbarmax as a function of time (using rolling 3-month time windows) and source (stack vs. fugitive). The results indicated that the optimum time for sampling for stack emissions was in the summer rather than in the winter, and that the optimum location was close to the facility rather than in the foothills of the Lakeside Mountains. For fugitive releases, the new EPA AERMOD modeling indicated that the optimum sampling time was in the winter, at locations relatively close to the facility. EPA promptly shared these new calculations with ERM in a conference call on August 12, 2013, and consensus was reached with ERM that these new calculations formed a more reliable basis than the previous analyses for choosing optimal Phase 1A sampling locations and times. Consequently, the final SAP presents a revised strategy based on the new EPA AERMOD analyses.]

ATTACHMENT 2

EPA Responses to ERM June 6, 2013, Comment Letter

I. *EPA-Approved Summary of Phase 1A Scoping Discussions*

General Comments

1. ERM noted several instances of revisions made by EPA to the wording in the original Technical Memorandum that are not reflected by italics. The document should be revised accordingly to reflect all instances of revised wording. That said, ERM has no objection to the revised wording except as noted below (see Specific Comments).

EPA Response: In finalizing the outcome notes, the EPA focused on "material" changes pertinent to scoping discussions.

2. The EPA comments/revisions are not always consistent with the ERM team's collective recollection of discussions during the various scoping discussions between EPA and ERM (e.g., number of samples, borings; see Specific Comments below).

EPA Response: The EPA notes ERM's point, and has responded specifically in other comments that engage this issue directly.

3. ERM is concerned that the description of the Administrative Order on Consent (AOC) and overview of scoping activities, as described by the EPA on pgs 1-3, misses the spirit of the agreement. For example, the discussion of the DMA as a substantial contribution by ERM to the Phase 1A SAP and as work "pursuant to the 'comment' phase" of the Phase 1 SAP, seems to set a precedent that the DMA may substitute for substantive concerns that ERM has on unresolved issues associated with the development of the Phase 1A SAP. ERM does not believe that this substitution is consistent with the spirit of the AOC.

EPA Response: Each of ERM/US Magnesium's specific substantive concerns are addressed by the EPA in this response to comments.

Specific Comments

1. Page 5, last bullet: EPA's assertion that Method 680 has been proposed too late in the planning stage for consideration for Phase 1A is arbitrary. The proposal to consider Method 680 was raised by ERM during the Post-DMA Phase 1A scoping discussion on 4 April 2013 at the same time as other analytical method modifications were being evaluated by EPA and ERM for use during Phase 1A. Other analytical method revisions or additions proposed 4 April 2013 (e.g., for perchlorate and SVOCs) have been approved by EPA. An alternative method for hexavalent chromium analysis (using IC-ICP-MS) was not considered during the 4 April 2013 call, but was proposed for use in Phase 1A by ERM on 18 April 2013, after identifying a commercial laboratory that performs this specialty analysis. EPA has also approved the revised method for hexavalent chromium analysis.

EPA Response: For PCB modified Method 680 please see the EPA response to comment #3 from ERM/US Magnesium's May 21, 2013 comment letter (see Attachment 1), the letter from EPA dated July 10, 2013 (see Attachment 2), and the EPA response to comment #149 from ERM/US Magnesium's Draft SAP comments (see Attachment 3).-- For Cr (VI) see Attachment 3 for the EPA responses to comments 200, 295, 302, 323, 327, 328 and 337 to ERM/US Magnesium's Draft SAP comments, and the EPA response to comment # 7 from ERM/US Magnesium's May 21, 2013 comment letter (see Attachment 1).

2. Page 5, last bullet: To date, ERM has not received any formal feedback from EPA on Method 680. EPA should provide ERM with their specific concerns regarding the "potential limitations for this method for complete, and accurate identification of all PCB congeners," to facilitate a meaningful technical discussion about this method.

EPA Response: Please see the EPA response to comment #3 from ERM/US Magnesium's May 21, 2013 comment letter (see Attachment 1) and the letter from EPA dated July 10, 2013 (see Attachment 3).

3. Page 6, first full paragraph/bullet: The correspondence associated with the scoping discussions was intended to be included as Attachment 1. However, the EPA addition at the end of this paragraph indicates that it is to be part of the SAP. ERM does not believe that it is necessary to include this correspondence in both places, and requests resolution with the EPA regarding the appropriate documentation approach. In any event, ERM/US Mag needs the opportunity to review such documentation (if prepared or altered by others) prior to providing comment on the associated document to which it is attached.

EPA Response: The Outcome Notes produced by ERM included an Attachment 1 entitled 'Scoping Meeting Outcome Memoranda', with no content or explanation of what ERM meant by this heading-title. The EPA simply noted this point in the final outcome notes, and furthermore stated EPA's intent to append the outcome notes record to the SAP. Worksheet #9 of the SAP provides a record of pertinent post-scoping technical discussions.

4. Page 8, first full paragraph: Clarification is required for the "EPA Oversight Report" referenced in this paragraph and elsewhere in the memo. ERM did not receive this report prior to issuance of the draft phase 1A SAP and did not have the opportunity to comment on conclusions or implications made to the scope of work included in the SAP. This is not consistent with the spirit of the AOC.

EPA Response: Pertinent issues that were identified by the EPA during the October-November 2012 DMA activities, in conjunction with points noted in the ERM DMA Reports, were provided in pre- and post-meeting materials for discussion with ERM/US Magnesium at the February 20, 2013 meeting in Salt Lake City and in a teleconference on March 6, 2103. These points were all consistent with the EPA-Contractor oversight report appended to the 23 June 2013 Draft SAP.

5. Page 9, third bullet: The rationale for collection of *"deep sediment"* samples from the active waste lagoons (PRIs 5 and 6) is unclear. EPA has stated that these samples are necessary to assess the chemical composition of *"early-era"* wastes and evaluate COPCs representative of submerged geochemical conditions; however, EPA has not provided a detailed explanation of why it believes the composition of the *"early-era"* waste may be significantly different than the current waste stream. Given that the manufacturing processes at the facility have been consistent since it began operation, with only minor changes in electrolytic cell technologies, there is no valid reason to suspect that previously unidentified classes of COPCs might have been generated in the past. The readily accessible sediment within the inlet area of the old waste pond (PRI 7) represents the waste stream from the initiation of operations to approximately 1986.

   If the EPA technical team has any specific information to support the assertion that there may be geochemical or redox conditions in submerged sediments that have the potential to create unique COPCs not present in surface sediment, please provide a detailed explanation. It appears that the EPA's primary rationale for collecting these data is to prevent erroneously screening out COPC based surface sediment data. This is highly unlikely because it is improbable that any chemicals will be screened out as COPCs in the ditches and active waste lagoons. Evaluation of the vertical distribution or "*COPC makeup"* of the deep

sediments is not necessary to achieve the Phase 1A DQOs and can be included in subsequent phases of the RI if necessary. ERM has asked the EPA to provide a fact-based technical justification for the collection of these data and to date has not been provided adequate explanations.

EPA response: Please see the EPA response to comment #5 from the ERM/US Magnesium's May 21, 2013 comment letter (Attachment 1).

6. ERM concurs that the *General Phase I Scoping* section (text and Table 1) as revised accurately reflects the scoping discussions.

EPA Response: Noted.

7. ERM concurs that the *Scope of Soil/Sediment/Waste Sampling* section as revised accurately reflects the scoping discussions except as noted herein.

EPA Response: Noted.

8. Page 10, first full bullet: VOCs should be removed from the list of analytes in this bullet. As revised, the bullet specifies that all samples collected from borings will be analyzed for VOCs; however this is not consistent with the decision made during Scoping Session 2 held April 17, 18, 19, & 20, 2012, nor follow up scoping discussions, which have only considered VOC analysis in 1) subsurface soil samples from the landfill, 2) surface (0 to 6 inches) sediment samples from active ditches, and 3) saturated sediment across the Site.

EPA Response: EPA further notes that in subsequent sampling/analysis discussions, ERM and EPA recognized that the presence of VOCs noted in all aqueous waste-water samples warrants the need for this analysis in all surface and subsurface aqueous and saturated samples.

9. Page 10, fourth full bullet: ERM and EPA agreed during scoping discussions that surface samples would only be analyzed for VOCs for *saturated* sediments and/or surface sediment samples within active wastewater ditches.

EPA Response: Noted and reflected in Phase 1A SAP.

10. Table 2, general: ERM's understanding is that ERM and EPA had concurred that the sample size required to determine whether or not a given constituent should be retained as a Compound of Potential Concern (COPC) for a given area is 14 samples. As such, 14 samples were specified in Table 2 to be collected within each PRI, with allowance for some bias samples as discussed for specific PRIs. EPA edits revised that number to be "a minimum of" 14 samples. If the SAP specifies more than 14 samples per PRI (other than a some additional bias samples at some PRIs, as needed), that would not be consistent with our understanding of the scoping discussions/concurrence.

EPA Response: The COPC selection procedure for humans and highly mobile ecological receptors is founded on the concept that, given a dataset of adequate size, the maximum concentration value in that data set will exceed the true mean concentration across the PRI. If the observed maximum concentration does not exceed the RBC, there is confidence the true mean will not exceed the RBC, and hence the chemical will not contribute significant risk and may confidently be excluded as a COPC.

However, if the data set is not large enough, the observed maximum concentration value may not exceed the true mean across the PRI and potentially lead to the exclusion of a chemical of concern. To insure with 95% probability that a COPC is not erroneously eliminated from further consideration, a *minimum* of 14 samples is required. The statistical basis for this number was initially presented to ERM/US Magnesium during the first scoping meeting in Salt Lake City and subsequently agreed to by all parties. The draft SAP reflects these agreements and includes a minimum 14 samples per PRI.

These sampling requirements do not apply to sessile ecological receptors or receptors of limited mobility because their risks are not related to an average concentration over a large area but rather to a chemical concentration at a point or over a small area ("home range").

To minimize the risk of inappropriately excluding a COPC for small home range receptors, it is necessary to significantly increase sample size. As set out in the SAP, an alternative strategy would add 2-4 additional samples to the data set, collecting these samples from locations that are considered most likely to be strongly contaminated by Site releases (e.g., locations near known points of release, areas that are visibly impacted, etc.). This strategy (adding 2-4 biased samples to the set of 14 systematic samples from a grid with a random start) will increase the probability of having one or more samples in the high end of the distribution (e.g., > 90^{th} percentile) so that a Cmax-based COPC selection protocol will be reliable for both large home range and small home range ecological receptors.

11. Table 2, general: The sampling approach discussed during scoping meetings identified a random sampling design for PRIs 2 through 16, with the inclusion of biased sample locations at selected PRIs. EPA's revision to a "systematic" sampling design at PRIs 5 and 6 is inconsistent with scoping discussions.

EPA Response: EPA has consistently maintained that a systematic sample design with a random start is appropriate for Phase 1A sample collection, as reflected in the final Phase 1A SAP.

12. Table 2, PRI-1 (Ditches): EPA's revisions added two boring locations for subsurface sampling in this PRI (an increase from two locations to four). As noted in the bullet, the borings are to be situated "at bridge areas" – we are only aware of two bridges that cross wastewater ditches at the site. ERM does not agree that the revisions accurately reflect the scoping discussions and believes that two borings (for subsurface sample collection in the Ditches) should be ample for Phase IA investigation purposes.

EPA Response: The EPA agrees that two borings (for subsurface sample collection in the Ditches) should be ample for Phase IA investigation purposes.

13. Table 2, PRI-2 (Landfill): EPA's revisions decreased the number of borings for subsurface sampling in this PRI (from 14 to three locations). ERM does not agree that the revisions accurately reflect the scoping discussions. However, the initial boring placement was developed prior to developing the Phase 1A/1B approach, and ERM concurs that 14 borings are more than are needed for COPC selection in this PRI. Therefore, ERM would have no objection to specifying a reduced number of borings (i.e., three) within this PRI in the Phase 1A SAP.

EPA Response: Noted.

14. Table 2, PRI-3 (Sanitary Lagoon): EPA's revisions added one boring for subsurface sampling in this PRI (to native material). ERM does not agree that the revisions accurately reflect the scoping discussions and does not believe that a boring (for subsurface sample collection in the PRI) is necessary for Phase IA investigation purposes.

EPA Response: The EPA understands that the 'sanitary lagoon' has been used as a disposal site. Existing reports indicate the potential presence of burrowing organisms that may be exposed to subsurface contaminants, substantiating the need for subsurface samples to determine the risk these contaminants pose to the environment.

15. Table 2, PRI-4 (Gypsum Pile): EPA's revisions added one boring for subsurface sampling in this PRI (to native material). ERM does not agree that the revisions accurately reflect the scoping discussions and does not believe that a boring (for subsurface sample collection in the PRI) is necessary for Phase IA investigation purposes.

EPA Response: The EPA understands that the Gypsum Pile has been used as a waste disposal site since the inception of Plant operations, and the makeup of slurry-transport waters during that time is unknown. Logic comparable to that for other subsurface sediment sampling applies similarly to this PRI (see the EPA response to comment no. 5 in Attachment 1).

16. Table 2, PRI-5 (SE Ponded Waste Lagoon): EPA's note inserted at the end of the Sample Type and Number entry indicates disagreement with the entry. Prior to finalization, the wording should be revised to reflect a common understanding of the scope discussed for this PRI. ERM requests input from EPA regarding appropriate revisions to the wording.

EPA Response: The EPA 'note' in Table 2 refers to the EPA's position in the discussion at page 9 of the Final Outcome Notes regarding the need to acquire submerged sediment samples at depth in waste lagoons. This is also noted in the Item 5 EPA response above, and explained in Attachment 1.

17. Table 2, PRI-6 (NW Ponded Waste Lagoon): EPA's note inserted at the end of the Sample Type and Number entry indicates disagreement with the entry. Prior to finalization, the wording should be revised to reflect a common understanding of the scope discussed for this PRI. ERM requests input from EPA regarding appropriate revisions to the wording.

EPA Response: The EPA 'note' in Table 2 refers to the EPA position in the discussion at page 9 of the final Outcome Notes regarding the need to acquire submerged sediment samples in waste lagoons. This is also noted in the Item 5 EPA response above, and explained in Attachment 1.

18. Table 2, PRI-7 (NE Ponded Waste Lagoon): EPA's revisions added one boring for subsurface sampling in this PRI (to native material). ERM does not agree that the revisions accurately reflect the scoping discussions and does not believe that a boring (for subsurface sample collection in the PRI) is necessary for Phase IA investigation purposes.

EPA Response: The EPA notes ERM's points. The EPA's basis for such sampling is as noted in the EPA's response to ERM comment #5 in the May 21 letter response.

19. Table 2, PRI-8 (NW Lagoon Overflow): EPA's revisions decreased the number of borings for subsurface sampling in this PRI (from 14 to one location). Although we agree that 14 samples may not be necessary, this revision does not accurately reflect the scoping discussions. Given the apparent subsurface flow of wastewater through this PRI, ERM questions whether one subsurface sample location would be sufficient for meeting the Phase 1A DQO. Fill material or waste is not present in this PRI; it is therefore unclear what is intended by the "single boring to native material" specified in EPA's revisions.

EPA Response: ERM's outcome notes did not mention obtaining 14 subsurface borings in this PRI, but did note "…Consider collecting limited samples from selected additional locations in terrestrial habitat, representing the 0- to 5-foot depth interval." The EPA accordingly responded in the Final Outcome Notes, by providing EPA's view that a 'single boring' should suffice for meeting the objectives. The EPA's SAP placement of a 'single-boring' in what is plausibly the most hydrologically active portion of the PRI, seems sufficient. ERM's 28June SAP comments about sampling this PRI do not mention the premise of additional subsurface borings in order to sufficiently assess potential COPC presence in the subsurface of this PRI.

20. Table 2, PRI-10 (Barium Sulfate Disposal Area): EPA's revisions added one boring for subsurface sampling in this PRI (to native material). ERM does not agree that the revisions accurately reflect the scoping discussions and does not believe that a boring (for subsurface sample collection in the PRI) is necessary for Phase IA investigation purposes.

EPA Response: The EPA's logic for collecting COPC samples that represent 'early-era' waste disposal was applied to this PRI (see Attachment 1, comment 5 response). The EPA notes that ERM's Draft SAP comments did not raise any issue regarding EPA's sampling plan, which called for the single boring sample for this PRI.

21. ERM concurs that the *Scope of Air Sampling* section text as revised accurately reflects the scoping discussions. However, on page 11, last bullet, the EPA comment indicates uncertainty regarding the meaning of the statement in the bullet. The subject statement should be revised to provide sufficient clarity prior to document finalization. ERM requests input from EPA regarding the nature of the uncertainty.

EPA Response: ERM's statement in the outcome notes implied an 'agreed upon' scope of work (or sampling plan) for the elements of a Phase 1A air monitoring program. The EPA's Final Outcome Notes reflect no agreement by EPA to a specific plan, and reflect the state of flux that continued with regard to ERM's ongoing AERMOD modeling, and the EPA's continuing assessment of the ERM December 2012 submittal of potential air-sampling plans. Subsequent technical discussions with ERM regarding the appropriateness of ERM's AERMOD grid-nodes, and further refinements to modeling considerations to better evaluate 'near-facility' air-dispersion continued, with technical consultation with ERM resolving the approach to air-COPC investigations which are now addressed in the Attachment 4 response to comments (#193) and set forth in the SAP.

22. ERM concurs that the *Scope of Groundwater Sampling* section text as revised accurately reflects the scoping discussions.

EPA Response: Noted.

23. Attachment 1, Scoping Meeting Outcome Memoranda: The EPA note indicates some uncertainty regarding the content of this attachment. This note should be removed prior to finalization. Please see the pdf version

of the 8 March 2013 Technical Memorandum, in which the attachment contained what ERM believed to be the relevant outcome memos. See also Specific Comment #1.

EPA Response: Clarification noted. The EPA now understands that the submitted document you are citing in Attachment 1 was the following memo:

Outcomes of Phase 1 Scoping Meeting
Date/Time: 6 Mar 2013, 1:00 p.m. to 3:40 p.m. (Mountain)
Location: Teleconference
Subject: Scoping Meeting Session – Post-DMA Chemistry/Analytical Technical Discussion

II. *Scoping Session 2, Air Breakout Call #2 – Summary Notes*

General Comments

1. The EPA comments/revisions are generally consistent with the ERM team's collective recollection of the discussions between EPA and ERM regarding the scope of the air sampling to be included in the Phase 1A investigation, with exceptions as described below.

EPA Response: Noted.

III. *EPA Responses to Outcome Notes Finalizing Discussions Regarding the Post-DMA Analytical Method Modifications for Soil, Sediment, Solid Waste and Surface Water for Ph-1A COPC Investigations.*

General Comments

1. It is not clear why EPA generated a separate outcomes memo for this call instead of providing comments on the outcomes memo prepared by ERM. The 2 May 2013 outcome memo prepared by ERM should be included as an attachment.

EPA Response: EPA chose to consolidate its response to the April 4, 2013 outcome-notes with a response to technical discussions that were ongoing after the 4 April consultation. Hence, the EPA prepared a separate outcomes memo on this subject.

EPA will include ERM's 4 April 2013 outcomes memo in WS#9 attachments and as part of the record.

2. The EPA summary is generally consistent with the ERM team's collective recollection of the discussions between EPA and ERM regarding analytical method modifications based on the results of the DMA, with exceptions as described herein (see Specific Comments below). However, in some cases, EPA has presented a description of specific items discussed during a given meeting/call that does not exactly match ERM's recollection. We have not identified every case below because the overall outcomes are consistent, and ERM's outcome memo provides sufficient clarification of the specific items discussed.

EPA Response: Noted; also see Attachment 4 where ERM comments addressing analytical methods points are addressed and reconciled for the Final SAP.

3. The package received by ERM was missing Attachment A. The first page of the memo implies that Attachment A includes five reference documents; however, the placeholder for Attachment A at the end of the memo identifies Attachment A as only the ERM agenda for the 4 April 2103 conference call. For clarity, all reference documents identified in the memo should be included as attachments.

EPA Response: Noted for correction. The referenced documents will be included in the WS#9 attachments for the record.

4. The following dates or references within the memorandum are incorrect and should be revised for clarity:
   - Page 2, First bullet: ERM's email re: Action Items from 4 April 2013 Phase 1A Laboratory Methods Call was transmitted to EPA 18 April 2013, not 17 April;
   - Page 2, second bullet: Revised UFP-QAPP Worksheets 19 and 23 were transmitted to EPA 2 May 2013, not 18 April;
   - Page 2, Background and Purpose, second paragraph: EPA's technical memorandum clarifying analytical issues was transmitted 25 March 2013, not 22 March;
   - Page 2, Background and Purpose, second paragraph: The 25 May 2013 EPA technical memorandum clarifying analytical issues is incorrectly listed as Attachment A; and
   - Page 6, Section 2.0, first paragraph: The EPA suggestions from 29 March 2013 referenced in this paragraph are presumed to be the EPA technical memorandum clarifying analytical issues that was transmitted 25 March 2013.

EPA Response: Noted.

Specific Comments

For ease of presentation, the Specific Comments are grouped by compound class rather than the order in which they were encountered in EPA's outcomes summary letter.

VOCs

1. Page 3, first first-order bullet: The text should be modified to reflect that ERM surveyed several labs in addition to TestAmerica for the availability of Method 8261A and could not find any commercial laboratory that performs this method. Therefore, it is not a viable method to use for samples collected from the site at this time.

2. Page 8, Item 1B. EPA's statement, "*ERM is now proposing to submit samples preserved with methanol for VOC analysis only when reactivity or frothing is not observed in the field"* is incorrect and should be revised to be consistent with Note 4 of revised UFP Worksheet 19 (i.e., both Encore and methanol-preserved samples will be submitted, unless\ off-gassing or reactivity is observed in the methanol vial, in which case the methanol vial will not be shipped).

EPA Response: Thank you for the comment. As ERM has undertaken finalization of lab-SOPs (pursuant to SOW Section 5.1.2), the appropriate corrections/modifications to the worksheets in the Phase 1A SAP has been completed.

PCBs

3. Page 4, bullet at top of page: PCB data needs were confirmed to be WHO congeners and total PCBs, not homolog totals. To avoid confusion, this bullet should be revised to read "total PCBs," not "total homologues."

EPA Response: Thank you for the comment. As ERM has undertaken finalization of lab-SOPs (pursuant to SOW Section 5.1.2), the appropriate corrections/modifications to the worksheets in the Phase 1A SAP has been completed.

4. Page 4, PCBs methods discussion: ERM noted that using Method 8082 is problematic because laboratories cannot quantitate all PCB congeners by this method, and that results from Method 8082 can be biased high if there are non-PCB chlorinated constituents in the samples (due to non-specificity of the detector). In the second paragraph, the third through fifth sentences misrepresent the discussions between ERM and EPA on 4 April 2013 and should be revised to reflect that these concerns were identified by EPA after the call. During the call, EPA acknowledged that they were unfamiliar with Method 680, and that they were open to considering either Method 8082 or Method 680 for use at the Site. EPA did not express technical concerns about sensitivity for WHO congeners, nor was there any discussion of concerns regarding peak summing/subtractions.

EPA Response: Thank you for the comment. EPA awaits ERM's DMA for Method Modification 680.

5. Page 8, Action item 8, Preparation of Detailed Work Instructions: ERM disagrees with the EPA assertion that "*Revision to PCB sampling and analysis protocols will not be possible prior to the commencement of Phase 1A* . . ." ERM is compiling the requested information for EPA review and expects to submit it by 7 June 1013. In addition, the statement "*it is likely that a modified method 680 will at best only partially achieve necessary MDLs"* is premature considering that TQL discussions are still in progress. Method 680 may be sensitive enough to use throughout the site, or it may be best applied to areas where concentrations are outside the working range of Method 1668, with Method 1668 used for expected low concentration samples. To date, ERM has not received any formal feedback from EPA on Method 680. EPA should provide ERM with their specific concerns regarding the "technical utility of Method 680 to provide useful essential data that will meet project DQOs for complete COPC identification." EPA should provide ERM their specific concerns with Method 680 to help facilitate a meaningful technical discussion about this method. As such, we also disagree with EPA's statement in the Summary that "No method modifications for PCBs are appropriate or required at this time."

EPA Response: Thank you for the comment. As ERM has undertaken finalization of lab-SOPs (pursuant to SOW Section 5.1.2) and the DMA for Method Modification 680, the Phase 1A SAP will be finalized. Any changes to analytical methods may be considered through the appropriate process (see Worksheet #14).

Dioxins/Furans

6. Note, top of page 5: Analytical methods for dioxins/furans were not discussed in detail in any of the meetings or calls. EPA included a note in the outcome summary memo suggesting that, for potential cost savings, ERM consider using Method 8280 (LRMS) for samples where ppm concentrations are expected. ERM notes that LRMS is likely to provide higher quality data for high concentration samples than the HRMS method (8290), and will discuss this option with our laboratory.

EPA Response: Thank you for the comment. Any changes to analytical methods may be considered through the appropriate process (see Worksheet #14).

SVOCs

7. Page 5, first bullet: This bullet does not accurately reflect the discussion on 4 April 2013. Robert Howe (contractor to EPA) stated that the SVOC list provided in the EPA technical memorandum of 25 March 2013 was generated based on a comparison of Method 8270C sensitivity to TQLs, the DMA data, compounds expected to be present at the Site, and historical Site data as summarized in the Expert Report of Dr. Finley. The SVOC list was therefore developed without input from EPA Risk Assessors.

EPA Response: Thank you for the comment.

Perchlorate

8. Page 7, Action Item 6: Lacking EPA's perchlorate data, the source of discrepancies between EPA and ERM perchlorate results in the DMA water samples is difficult to investigate. Section 8 of Method 6850 states that: "[w]henever possible, water samples should be sterilely filtered in the field at the time of collection using 0.2-µm PTFE membrane filtration in order to remove potentially perchlorate degrading microbes" and that all samples and extracts should be stored "with headspace to reduce potential anaerobic biodegradation." Particulate material in the 0.2 to 0.45 µm size range is not listed as an interference in Section 4.0 of Method 6850. EPA has not provided any data to support their concern that filtration using a 0.2 µm filter causes interference for this method. Unless EPA can provide data to support deviating from the Method, ERM proposes that all water samples be filtered using a sterile 0.2 µm filter.

EPA Response: Thank you for the comment. As ERM has undertaken finalization of lab-SOPs (pursuant to SOW Section 5.1.2), the appropriate corrections/modifications to the worksheets in the Phase 1A SAP has been completed.

Hexavalent chromium

9. Page 7, Action Item7. Although there was initial agreement that analysis of total chromium would be sufficient for Phase 1A, EPA has yet to acknowledge ERM's proposal on 18 April 2013 to analyze water samples for hexavalent chromium by the IC-ICP-MS method. This method is likely to achieve a lower DL for hexavalent chromium than is achievable for chromium by the total chromium analytical method; therefore, ERM has proposed the IC-ICP-MS method for use in Phase 1A.

EPA Response: Thank you for the comment. The worksheets in the Phase 1A SAP reflect the use of IC-ICP-MS.

10. Page 9, Item 5: Although not stated explicitly in the memo, ERM assumes that EPA agrees with the use of the IC-ICP-MS method for hexavalent chromium analysis during Phase 1A. It is not clear what is meant by "except as noted above," as the discussion of hexavalent chromium on Page 7 did not identify aspects of hexavalent chromium analysis with which EPA disagreed.

EPA Response: The worksheets in the Phase 1A SAP reflect the use of IC-ICP-MS.

ERM anticipates that EPA will consider these comments and revisions part of the final EPA approved Scoping Outcome Notes, and incorporate all substantive changes into the draft Phase 1A SAP.

EPA Response: Revisions are incorporated or will be an Addendum to the Phase 1A SAP as appropriate.

ATTACHMENT 3

EPA Response to ERM June 12, 2013 Memorandum Regarding PCB Method 680/8270M Analysis

During the February 2013 consultations regarding the findings and analytical results from the October 2012 Demonstration of Methods Applicability (DMA) investigations, ERM raised interest in utilizing a substantially lower-cost analytical Method 680 for PCB analysis. The EPA stated a willingness to consider the merits of this method and its use for site sample analysis if: a) all information necessary to substantiate specific laboratory methods were provided, and b) the procedures could be shown to produce reliable results for the complex chemical matrix conditions at the US Magnesium (USMag) site.

On June 12, 2013, ERM provided a memorandum to the EPA that included:

- the complete package of technical materials to support ERM's proposal to utilize a modified Method 680 for specific PCB-congener analysis, an analytical procedure purportedly able to achieve the detection levels required for the USMag site at a lower cost than utilizing EPA Method 1668; and

- ERM's condition that, because it recognized (based on October 2012 DMA results) that PCBs would be retained as chemicals-of-concern, ERM would agree to the EPA's requirement (that the modified Method 680 must first be evaluated with a DMA on site samples), only if EPA would agree that planned sample collection in the most heavily contaminated PRIs (which would necessarily require PCB analyses) be deferred to a subsequent Phase 1B stage of site investigations.

During the July 9, 2013, meeting, ERM reiterated the potential benefits of completing the PCB-Method 680 DMA, which ERM said it could complete within 3 months, before implementing sampling and analysis plans for PRIs 1, 3, and 4-7. The EPA advised ERM that it had completed technical evaluation of the modified Method 680 package and would be approving the evaluation of the method for site-specific use under a DMA work plan, which ERM should prepare for EPA approval (see attached EPA July 10, 2013, letter below).

EPA's July 10, 2013 letter approving Method 680 DMA proposal

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
1595 Wynkoop Street
Denver, CO 80202-1129
Phone 800-227-8917
www.epa.gov/region8

July 10, 2013

Ref: EPR-SR

Mr. David Abranovic
Environmental Resources Management
7272 East Indian School Road, Suite 100
Scottsdale, AZ 85251

Re: Modified Method 680 Analysis and DMA for PCBs

Dear Mr. Abranovic:

The EPA has reviewed your June 12, 2013 memorandum and technical materials regarding modified Method 680.

Based on our review of the technical information provided, the EPA believes this method has potentially useful application to media contaminated with high levels of PCBs at the US Magnesium Superfund Site, and feels it is appropriate to move ahead with a Demonstration of Methods Applicability (DMA) to evaluate the efficacy of the modified Method 680 on authentic site samples. The EPA does not accept your conditional premise to carry out a PCB-DMA only if linked to the EPA's agreement to defer analysis of PCBs in samples from "inner" PRIs to a Ph-1B investigation. Rather, given ERM's long-stated interest in utilizing this method on its technical and cost-savings merits, the EPA recommends the following path forward:

- **Step 1: Design and implement (per EPA's approval) an addendum to the September 2012 DMA Work Plan that provides an initial assessment of modified Method 680 performance on authentic site solid and aqueous samples.**

  As with all methods that are planned for use in Phase 1 or subsequent investigations, the EPA generally requires some level of testing and demonstration of method applicability before committing to implementing the method on-site. In this regard, modified Method 680 is no different than any other method.

  The design for this modified Method 680 DMA addendum can be relatively simple, and the plan can be developed as a brief addendum to the original DMA for solid and aqueous media. The EPA suggests that the core of the design include using modified Method 680 to test some or all of the existing solid and aqueous samples that were collected during the October 2012 DMA, and then comparing the results to those obtained during the original DMA Method 1668 analyses. Table 1 (attached) summarizes total PCB levels and TEQ levels for samples collected during the October 2012 DMA exercise and analyzed using Method 1668, calculated from the data reported by ERM.

  The EPA will require at a minimum the eight (8) soil-sediment samples and four (4) water samples in the following list to be included in the DMA addendum.

REQUIRED SAMPLES FOR DMA ADDENDUM

Soil-Sediment	Water
1 DMA-Sed-PRI7-2	1 DMA-WW-PRI1-2
2 DMA-Gyp-PRI4-1	2 DMA-WW-PRI5-1
3 DMA-Gyp-PRI4-2	3 DMA-WW-PRI6
4 DMA-Sed-PRI1-1	4 DMA-W-PRI7-1
5 DMA-Sed-PRI1-2	
6 DMA-Sed-PRI5-1	
7 DMA-Sed-PRI6	
8 DMA-Sed-PRI7-1	

In addition to these site specific samples, the EPA will provide a set of Performance Evaluation (PE) samples for inclusion in the DMA.

The EPA suggests a technical call between the EPA and ERM to work out the basic requirements of the DMA before a Work Plan Addendum is drafted.

- **Step 2: Potential modification of Phase 1 RI to include use of modified Method 680**

  EPA proposes the following strategy for potential use of modified Method 680 in Phase 1 (assuming the DMA indicates that modified Method 680 performs as expected):

  a) Use modified Method 680 as the primary analytical technique for all soil/sediment/water samples where it is anticipated that PCB levels are likely to be higher than the detection limits for the method (as evaluated in the DMA addendum). Use Method 1668 for all other samples where PCB levels are expected to be lower than the detection limits of modified Method 680.
  b) For a subset of samples that are found to contain high levels of PCBs by modified Method 680, perform confirmation analysis by Method 1668 to further support the reliability of the method.
  c) If a sample that was expected to contain elevated PCBs was analyzed by modified Method 680 and found to contain levels lower than can be reliably quantified by the method, then reanalyze the sample using Method 1668.

  Important elements of the approach that will need to be finalized include a) which samples (location, medium) are expected to be appropriate for initial analysis by modified Method 680, and b) development of a clear rule for when a follow-on analysis by Method 1668 would be needed.

The EPA looks forward to working with ERM to quickly resolve the details of the DMA addendum and working to revise the draft Phase 1A analytical strategy as may be appropriate.

Sincerely,

/s/ Ken Wangerud
Remedial Project Manager

Enclosure
cc: Chad Gilgen, UDEQ

Table 1 - SUMMARY OF PCB DATA FROM OCTOBER 2012 DMA SAMPLES USING METHOD 1668

PANEL A: SOLID MEDIA SAMPLES RANK ORDERED ON TOTAL PCBs (ng/kg)

PRI	Sample No,	ERM(1)	ERM(2)	Mean
1	DMA-Sed-PRI1-2	1.7E+06	1.6E+06	1.6E+06
1	DMA-Sed-PRI1-1	1.3E+06	1.3E+06	1.3E+06
7	DMA-Sed-PRI7-2	9.8E+05	1.0E+06	9.9E+05
4	DMA-Gyp-PRI4-1	1.6E+05	1.7E+05	1.7E+05
5	DMA-Sed-PRI5-1	8.7E+04	1.0E+05	9.6E+04
7	DMA-Sed-PRI7-1	9.9E+04	9.0E+04	9.4E+04
6	DMA-Sed-PRI6	9.6E+04	9.2E+04	9.4E+04
4	DMA-Gyp-PRI4-2	9.3E+04	5.7E+04	7.5E+04
6	DMA-Soil-PRI6	4.2E+03	4.1E+03	4.1E+03
5	DMA-Sed-PRI5-2	2.1E+03	1.8E+03	1.9E+03
5	DMA-Soil-PRI5	1.3E+03	1.6E+03	1.4E+03
14	DMA-Sed-PRI14	1.3E+03	1.2E+03	1.3E+03
9	DMA-SMUT-PRI09-1	9.8E+02	5.7E+02	7.8E+02
9	DMA-SMUT-PRI09-2	4.2E+02	3.3E+02	3.7E+02
15	DMA-Soil-PRI15	1.4E+02	1.4E+02	1.4E+02

PANEL B: SOLID MEDIA RANK ORDERED ON TEQ (ng/kg)

PRI	Sample No,	ERM(1)	ERM(2)	Mean
7	DMA-Sed-PRI7-2	7.4E+01	7.6E+01	7.5E+01
1	DMA-Sed-PRI1-2	5.5E+01	5.3E+01	5.4E+01
1	DMA-Sed-PRI1-1	4.6E+01	5.8E+01	5.2E+01
4	DMA-Gyp-PRI4-1	9.3E+00	1.2E+01	1.1E+01
6	DMA-Sed-PRI6	7.1E+00	5.0E+00	6.0E+00
7	DMA-Sed-PRI7-1	5.5E+00	5.1E+00	5.3E+00
5	DMA-Sed-PRI5-1	2.2E+00	2.6E+00	2.4E+00
4	DMA-Gyp-PRI4-2	2.8E+00	1.9E+00	2.4E+00
6	DMA-Soil-PRI6	1.6E-01	1.2E-01	1.4E-01
14	DMA-Sed-PRI14	1.4E-01	1.2E-01	1.3E-01
9	DMA-SMUT-PRI09-1	6.3E-02	5.3E-02	5.8E-02
5	DMA-Sed-PRI5-2	5.6E-02	3.8E-02	4.7E-02
9	DMA-SMUT-PRI09-2	4.6E-02	3.0E-02	3.8E-02
5	DMA-Soil-PRI5	3.2E-02	2.3E-02	2.7E-02
15	DMA-Soil-PRI15	7.1E-03	4.5E-03	5.8E-03

PANEL C: AQUEOUS SAMPLES RANK ORDERED ON TOTAL PCBs (ng/kg)

PRI	Sample No,	ERM(1)	ERM(2)	Mean
1	DMA-WW-PRI1-2	1.1E+06	1.4E+06	1.3E+06
5	DMA-WW-PRI5-1	1.7E+05	1.9E+05	1.8E+05
6	DMA-WW-PRI6	1.2E+05	1.8E+05	1.5E+05
7	DMA-W-PRI7-1	1.6E+04	1.5E+04	1.6E+04
14	DMA-W-PRI14	1.3E+02	1.4E+02	1.4E+02

PANEL D: AQUEOUS MEDIA RANK ORDERED ON TEQ (ng/kg)

PRI	Sample No,	ERM(1)	ERM(2)	Mean
1	DMA-WW-PRI1-2	1.0E+01	2.7E+01	1.9E+01
5	DMA-WW-PRI5-1	3.3E+00	3.2E+00	3.2E+00
6	DMA-WW-PRI6	2.5E+00	3.3E+00	2.9E+00
7	DMA-W-PRI7-1	6.3E-02	4.4E-02	5.4E-02
14	DMA-W-PRI14	5.1E-02	2.6E-02	3.9E-02

Notes:
ERM(1) is the main field sample collected by ERM
ERM(2) is the laboratory duplicate analyzed by ERM's laboratory
Total PCBs were calculated by summing the homolog sample results.
Calculating TEQs – Detected values, EMPCs, and non-detect values were treated as shown below:

a. Detection – use Result
b. EMPC – use Result
c. Non-Detect – use ½ Result

$TEQ = \Sigma (TEF_i * C_i)$. TEFs are for mammals using 2005 WHO values

ATTACHMENT 4
EPA Responses to ERM Comments on May 2013 Draft Phase 1A SAP

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
1.	General	NA	NA		The document contains numerous typos, grammatical errors and consistency issues. Although many are identified in the specific comments, the revised SAP should be put through an editorial review.	Correct typos, grammatical errors, and consistency issues.	The final SAP has undergone technical editing.
2.	General	NA	NA		The SAP contains significant technical errors and does not include many of the field procedures and analytical methods determined to be necessary by ERM and USEPA based on the results of the Demonstration of Method Applicability (DMA).	ERM will provide USEPA with corrected UFP-QAPP worksheets (WS) that reflect the procedures and analytical methods required to implement Phase 1A	The EPA will review the revised worksheets provided by ERM and incorporate these into the final SAP as appropriate. The final SAP will reflect "lessons learned" from the DMA.
					It does not align with the final USEPA-approved Data Management Plan (DMP),		See responses to comments 239-245.
					nor does it incorporate USEPA's own recommendations from the DMA oversight report as described in the comment below		Worksheet #17 was revised to include lessons learned from the DMA regarding sample collection and Worksheet #19 was revised include DMA lessons learned regarding sample analysis.
					There are also numerous inconsistencies in the numbers of samples referenced in worksheets for multiple PRIs		The SAP has been revised to ensure consistency in sample numbers between worksheets.
					and there are no sample IDs for proposed sample locations		Sample location identification numbers have been assigned and are included in Tables 14-1 and 14-2.
					It does not address the need for likely sampling modifications based on field-conditions (e.g., no water present, no soil present, location is inaccessible, etc.), but instead relies on a burdensome SAP modification process whereby the USEPA	Recommend including a systematic, efficient SAP modification procedure for likely situations, such as the need to delete or relocate inaccessible samples, that do not require the	The SAP has been revised to specify a somewhat more flexible protocol for obtaining approval for field changes. The protocol is presented in Worksheet #14. Note, however, that no changes are allowed until EPA approval is

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
					RPM approve any deviation from the SAP.	burdensome and inefficient SAP change procedure included in WS6.	issued.
					As written, it is not practical to implement Phase 1A unless the SAP is significantly revised.		The EPA has made revisions to the draft SAP in response to the comments provided and the final SAP is appropriate for implementation.
3.	General				The SAP fails to incorporate many of USEPA's own recommendations based on the October 2012 DMA. Specifically, the USEPA DMA Oversight Report (Draft SAP Attachment 11F) included the following recommendations that are not reflected in the SAP: • Identifying field parameters that are required to be measured during sampling, including measurement of pH for solid-matrix samples; • Specifying that sampling must be conducted from suspected less contaminated areas to more contaminated areas to avoid potential cross contamination; • Specifying a tolerance for obtaining sample location coordinates of +1 meter (note that WS 14, Section 14.5.1.2 requires all sample locations to be surveyed by a Utah-licensed surveyor to a horizontal accuracy of 0.1 feet); and • Requiring collection of sample aliquots of solid media in a consistent pattern, regardless of the consistency of the material.		The SAP has been revised as follows: • Field parameters are identified in Worksheet #17. • The requirement to sample from less contaminated areas to more contaminated areas is identified in Worksheet #17. • Tolerances for sampling locations have been clarified and are identified in Worksheet #14. • Requirements for collection of sample aliquots in a consistent pattern are identified in Worksheet #17.

ATTACHMENT 4
EPA Responses to ERM Comments on May 2013 Draft Phase 1A SAP

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
4.	General	NA	NA		PDF of this size should be bookmarked and TOC should be hot-linked to specific worksheets for easier navigation.		The SAP has been revised as suggested.
5.	General	NA	NA		Many aspects of the sample designs presented in the SAP are not related to achieving the Phase 1A Data Quality Objective (DQO) to select the Contaminants of Potential Concern (COPC). ERM and the USEPA engaged in a lengthy and detailed scoping process to develop the Phase 1A sample designs. Through this process the technical team agreed on the types and numbers of samples that would need to be collected from each PRI in order to achieve the Phase 1A DQO. The sample designs discussed and agreed to by the technical teams were summarized in ERM's 8 March 2013 Summary of Phase 1A Scoping Discussions. However, many elements of the sample designs presented in the draft Phase 1A SAP are not consistent with outcomes of the scoping process and are not acceptable to US Magnesium. Detailed comments on the SAP content in question are presented in the specific comments below, but the major scope of work elements not adequately discussed or agreed to during the scoping process include:	Eliminate all samples not related to achieving the Phase 1A DQO of COPC selection from the SAP	The EPA has carefully considered all of ERM's recommendations and comments regarding the sampling requirements of the Phase 1A SAP and all samples specified in the final SAP are needed to maximize the likelihood of achieving the DQOs. Agreement from US Magnesium or ERM with the EPA's final decisions is not required.
					The collection of subsurface samples, in PRIs 4, 5, 6 and 7 do not appear to be required for COPC selection. The rationale	Provide a detailed, PRI-specific technical rationale in the DQO development as to why deep	The need for depth samples is already explained in Section 11.3.1 (Step 7). However, the SAP has been revised to

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
					provided in step 7 of the DQO process (WS11) for collecting these samples is not PRI-specific and too general to support including them in the SAP. For example the assertion that "…older more highly concentrated wastes may have been buried, covered, or reworked…" is hypothetical and inappropriate to apply to all PRIs. Although there are specific areas where sediments may have been disturbed, such as the ditch dredge spoils, there is no evidence of this in most PRIs. The PRIs where this had occurred were discussed during the scoping process and limited subsurface samples were included in the design (i.e., PRIs 1, 2 and 10). In addition, the statement that "historic waste release rates of COPCs may have been greater in the past because of changes in the magnesium production process" is completely unsubstantiated. The waste streams at US Magnesium have been relatively uniform since the facility has been in operation, and the USEPA has not presented any specific information to support the assumption that historical waste streams are likely to have been significantly more concentrated, if at all. The final rationale presented for collecting subsurface samples is that "transport of contamination may have resulted in subsurface contamination that may be higher than at the surface" is not supported by fact and directly contradicts the	sediment/soil samples are required for COPC selection and an explanation of why/how each location was selected.	provide additional rationale for the need for deep sediment/soil samples, and the basis for their location in Worksheet #11 and in Worksheet #14 (Table 14-2 and 14-3). *A priori* evidence of variations in type or amount of contaminants as a function of depth is not required to justify the need for collection of such samples. See also the EPA's response to ERM's 21 May 2013 letter.

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
					statement on line 2145 that "At most environmental sites, contaminants tend to be highest in surficial soils or sediments, with decreasing concentrations as a function of depth."		
					The need for evaluating bulk versus fine soil/sediment/waste is unsubstantiated as it relates to COPC selection. The two factors presented in the SAP to support collecting these data are stated to be "important for risk assessment" and are clearly related to exposure and not COPC selection. ERM does not believe that determining if "concentrations of contaminants may be higher in the fine grained particles" is a relevant study question for Phase 1A, and it was not discussed or agreed to during the scoping process. It is well understood and accepted in environmental sampling of solid media that contaminant concentration may be higher in fine-grained particles. This factor was fully evaluated during the DMA as it relates to data reproducibility, and was clearly shown to not be of concern for the Phase 1A. If bulk versus fine particle concentration is determined to be a relevant study question through the DQO development process, it can be addressed in a later phase of the RI.	Omit all references to evaluating bulk versus fine soil/sediment/waste from the Phase 1A SAP.	The EPA does not agree. Determining if concentrations are higher in fine grained material than coarse material is relevant to COPC selection. If concentrations are higher in fine grained than coarse materials, then the possibility exists that COPC decisions based on coarse materials could exclude an analyte that would have been retained had the decision been based on fine-grained materials. It is not correct that this was evaluated in the DMA. A test of precision between different aliquots of a sample is not the same as an assessment of variation as a function of particle size. No data have yet been collected that compare concentrations in fine grained to coarse grained materials. Worksheet #11 has been revised to provide additional clarification of sieving samples.
					The need for collecting submerged samples from PRI 5 and 6 was not adequately evaluated during the scoping process, and the rationale for collecting these samples is not included in step 7 of		The SAP has been revised to provide additional discussion of the need for collection of submerged samples. In brief, the EPA considers it possible that concentrations in sediments at a

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
					the DQO process (WS11). ERM believes that although it may be possible to collect a few near shore submerged surface samples from these PRIs, as discussed during the scoping process; there is no technical justification that merits the safety risks and considerable expense that would be incurred to collect the 10 to 15 submerged samples included in the draft Phase 1A SAP.		location may depend on the frequency that the location is under water, and locations that are under water more often may tend to have higher concentrations than locations that are only occasionally or rarely underwater. If samples were collected only from areas that are occasionally or rarely submerged, the possibility exists that an analyte could be excluded as a COPC when it should be retained. In accord with the AOC, if ERM believes that the collection of such samples is unsafe, the EPA will make arrangements to collect the samples.
					The sample design proposed for several PRIs includes more than the 14 samples required for COPC selection. The additional samples appear to be included to accommodate bias sample locations that were not discussed or agreed to during the scoping process.		The draft Phase 1A SAP explained the need for additional biased samples in some PRIs (see lines 2098-2114). This concept was discussed during scoping meetings. Agreement from US Magnesium or ERM with the EPA's final decisions is not required.
6.	General	NA	NA		Much of the preliminary WSs contain detailed background information about the site that is too broad in scope and is not relevant to Phase 1A of the RI. The UFP-QAPP Manual (USEPA-505-B-04-900A) stipulates that the site history and background sections should provide "the reasons for conducting the project, including historical information, current site conditions, and other existing data applicable to the project. This information can be used to clearly define the problem	The SAP should be streamlined to focus on the site background data and data gaps specific to the Phase 1A DQO of COPC selection. Revise text as indicated in specific comments below.	Worksheet #10 is intended to capture all available knowledge and understanding about the site. Such information is useful in the design of any sampling plan, including a plan focused on COPC selection. The text of Worksheet #10 has been revised to provide a brief statement as to why the historic data on environmental concentrations of site-related contaminants will not be used for COPC selection.

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					and the environmental questions that should be answered for the current investigation." The draft SAP provides a preliminary CSM discussion that is mostly not relevant to Phase 1A DQO, and presents extensive historic data but fails to identify data sources and limitations of use in a Secondary Data Criteria and Limitations table (WS13), as required by the UFP-QAPP Manual. Furthermore, the historic data summaries were compiled by manual manipulation of historic reports rather than from the official Project Database, which resulted in numerous errors and omissions. The discussion of data needs and scopes of work for future phase of the RI is not appropriate and is not consistent with the UFP-QAPP Manual. As presented, the extraneous information is distracting and unnecessary.		
7.	General	NA	NA		Much of the site background information presented in Work Sheet (WS) 10 is not factual, but is hypothetical and/or the subjective opinion of the authors. This type of opinion-based information is not appropriate for a technical document and is not necessary to support the Phase 1A DQO and sample design. There are also several places in WS10 where the authors either present original interpretation and conclusions based on secondary data, or selectively extract or omit excerpts from cited reports to support what appears to be	Omit all opinion-based information and bias conclusions drawn from past reports from the draft SAP.	It is not inappropriate for the SAP to form and present opinions and tentative conclusions based on information that is available. All specific text that ERM identified as inaccurate or inappropriate was reviewed and any factual errors were corrected. With regard to the specific example included in this comment, the line number cited is not correct so the exact text in question is unclear. Assuming

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					a prejudged opinion. Numerous specific examples of opinion-based information are provided in the specific comments presented below. An example of this is Section 10.4 Risk Assessment Findings Reported by Others, where excerpts from expert opinion reports are presented that suggest the entire site poses an unacceptable risk (line 1552), when in fact the historical risk assessment record did not reach a consensus regarding the level of ecological or human health risk at the site. The quoted expert opinion reports are not risk assessments prepared using USEPA guidance and thus should not be presented as risk assessment findings.		that the comment is intended to refer to the conclusions drawn by Stratus (2007) (line 1572, not 1552), the text clearly states that the conclusions presented are those of the authors of the report. There is no implication that the EPA either agrees or disagrees with the authors' conclusions.
8.	General	NA	NA		The sample rationale for each PRI is not presented in one place. There are circular cross-references in several WSs (e.g., WS11, WS14, or WS18) but a clear and concise explanation of the samples designs is not presented. It is recommended that PRI-specific rationales be placed in WS 14. Additionally, WS18 should be significantly revised to include a rationale for every sample location and the sample IDs should be presented in Figures 14-1 to 14-15. This would improve the transparency of the proposed sample design.	Revise Work Sheet 11 to clearly present the rationale used to develop the sample design for each PRI. WS18 should be revised to include the rationale for every sample location correlated to the sample IDs presented in Figures 14-1 to 14-15.	The SAP has been revised to present the rationale for sampling designs more clearly. Worksheet #11 has been revised to present the general rationale for the locations of unbiased samples. Worksheet #14 presents the specific rationale for the placement of biased samples. All samples specified in the SAP have been assigned a sample identification number to facilitate discussion of the rationale for each sample.
9.	General Comment	NA	NA		The sample design proposed for several PRIs include more than the 14 samples required to satisfy the statistical sample design criteria for COPC selection. The additional samples appear to be included to	Please add an explanation of the basis for the sample grids proposed for each PRI. Omit samples that are not required to satisfy the statistical sample	Worksheet #11 has been revised to provide additional description of how the grids were created. In addition, Worksheet #14 includes tables that describe the rationale for selection of

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					accommodate bias sample locations not discussed or agreed to during the scoping process. The statistical development of the sample size assumes that the samples will be placed randomly. This is important as the random nature of the sample locations ensure that the data are independent. There is no discussion in later sections (see line 2137) regarding the need for random placement of samples. While a purely random placement of samples is preferred as there is no need to know the underlying distribution of the dataset, a random systematic grid can also be used if it is clear that the contamination is not distributed in a uniform pattern across the site. A random systematic grid places the first node randomly and then the systematic grid is laid down from the random first point. It is unclear if the systematic grid used for the soil and sediment sampling is based on a random systematic design, or if the grid was placed judgmentally. If the latter is true, then the underlying statistical assumptions on which the sample size estimation is based are violated.	design criteria in order to reduce overall sampling costs.	sample locations, including grid samples, in each PRI. All samples called for in the SAP are considered to be necessary to achieving the DQOs.
10.	General	NA	NA		Throughout the SAP, statements are made that sampling will be completed as described "unless otherwise stipulated by USEPA." The SAP does not identify the documentation and approval process for USEPA stipulated changes to the scope of work.	The change procedure included in WS6 should be updated to state the approval criteria and documentation process for USEPA, and/or USEPA contractor, requested modifications to the scope of	The SAP has been revised to specify a somewhat more flexible protocol for obtaining approval for field changes that are recommended either by ERM or the EPA. This protocol is presented in Worksheet #14 (Section 14.3.4). Note, however, that no changes are

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						work included in the SAP.	allowed until the EPA approval is issued.
11.	General	NA	NA		The SAP does not describe USEPA split sampling to be performed during Phase 1A. This is problematic as it affects soil sampling methods (amount of soil required) and water sampling methods (use of splitters). The UFP-QAPP Manual states: "[t]he requirements of the UFP-QAPP Manual must also be adhered to by regulatory entities collecting environmental data for oversight purposes" (Section 1.1.2) and "[w]henever split sampling and analysis are performed (e.g., multiple data generators on the same project or as part of USEPA oversight of the lead organization and its contractors and subcontractors), comparability criteria must be established and documented in the QAPP or the oversight QAPP prior to data collection" (Section 2.6.2.5.1).	Oversight split sampling should either be added to the Phase 1A SAP or USEPA should provide an oversight QAPP for ERM review and comment.	A separate oversight QAPP will be prepared by the EPA in accordance with EPA quality requirements. The Oversight QAPP will define criteria for data comparability following the DQO process. The oversight QAPP will be provided to US Magnesium/ERM for review. The EPA will coordinate with ERM to plan the logistics of collecting split samples during implementation of the Phase 1A investigation.
12.	General	NA	NA		The strategy presented for COPC selection focuses only on the data required to screen out COPCs from further evaluation in the RI. The SAP must also include the data requirements necessary to make the decision to retain individual chemicals or entire classes of chemicals as COPCs. This option should be used to carry COPCs forward in select PRIs and develop additional sample designs based on a Phase 1B DQO, presumably focused on defining nature and extent and exposure concentration determination. This approach	An alternative should be included in the Phase 1A SAP to discontinue data collection in PRIs where definitive data exist to show the presence of COPC concentrations that exceed likely screening level benchmarks.	The EPA COPC selection is inherently a conservative process. That is, an analyte may be excluded as a COPC only if it is clear that it does not contribute significant human or ecological risk. Thus, the Phase 1A sampling effort has been designed to obtain sufficient data to provide confidence that all analytes excluded as COPCs are not of substantial concern. The process is not intended to "screen in" certain analytes. Analytes that are not screened out are retained.

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					could be used to achieve the Phase 1A DQO in several PRI with significantly less data collection than is currently included in the SAP. The current approach stipulates that a COPC can be screened out for further evaluation in the RI if sample concentrations (14 minimum) are below generic benchmarks selected for the screening level risk assessment. This implies that if a COPC concentration exceeds its benchmark in any sample, it will be retained for further evaluation.		This approach is consistent with EPA guidance.
13.	0016-0045	3	WS2		The content of WS 2 is not consistent with the UFP-QAPP Manual (USEPA-505-B-04-900A). Key information required to be included in WS2 is missing and the discussion of the scope of work to be included in future phases of the RI is not a required element and is inappropriate to include in the SAP. If a general overview is necessary, it should be limited to a discussion of the RI/FS process, and where Phase 1A fits into this process and not describe what potential future phases might look like.	Omit lines 17 to 78 that reference the scope of work to be included in future phases of the RI from this SAP. Include the following information in WS 2: • Name of contractor implementing the SAP • A description of the regulatory program (i.e., CERCLA and the RI/FS process) that the work is being conducted under and a reference to the AOC • A list of the entities that will use the data collected • Identification as a generic or project-specific QAPP • Organizational partners (stakeholders) and	Worksheet #2 has been revised to provide the information identified in the guidance. The information provided in Worksheet #2 is appropriate and consistent with the UFP QAPP Manual which states that the QAPP identifying information should preface the content of the QAPP and place the document in context (EPA 2005). Worksheet #2 has been revised to include the name of the contractor implementing the SAP, an explanation that the RI is being conducted in accordance with CERCLA, and to provide a reference to the AOC. Worksheet #2 identifies the stakeholders and users of the information. Worksheet #2 also states that this is a project-specific SAP.

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						connection with USEPA Region 8 • A description of QAPP element groups and required information not applicable to this project or provided elsewhere	
14.	0058	4	WS2		The text "Upon completion of investigation activities, and completion of a SLERA by USEPA…" is incorrect. Section 5.3 of the Statement of Work states that the SLERA will be prepared by the Respondent.	"Upon completion of investigation activities, and completion of a SLERA by ERM…"	The text has been revised as suggested, noting that the EPA will provide oversight of all risk assessment related activities.
15.	0123	10	WS6		The requirement that "Any changes to approved field procedures or the SAP will require documentation that must be approved by the USEPA RPM before the change is implemented" is impractical and overly burdensome.	USEPA should provide specific guidance on what constitutes a change requiring RPM approval. USEPA should also provide, at a minimum, contact information for an alternate if the RPM is unavailable during the investigation. Suggest including a pre-collection survey of the planned sample locations to identify locations that are not accessible and/or need to be adjusted due to site constraints. Alternate locations could then be selected in consultation with USEPA prior to mobilization of the sample crew.	See response to comment 10. Survey coordinates were provided to ERM on August 14, 2013, to facilitate early identification of the sample locations in the field.
16.	0123	12	WS6		The requirement to "prepare a field change request for any minor changes in sampling procedures that occur as a result of conditions in the field" is impractical and overly burdensome.	Include specific guidance on what constitutes a change requiring approval for "...significant changes in sampling procedures…"	The EPA does not believe it is necessary, appropriate, or feasible to prepare written guidance that segregates changes into "minor" and "not minor." See response to comment

ATTACHMENT 4
EPA Responses to ERM Comments on May 2013 Draft Phase 1A SAP

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
							10.
17.	0123	12	WS6		The acronym TM is not defined in the SAP, and it is unclear whether QAM is referring to the ERM QA/QC Manager or the USEPA Contractor QA Manager. These ambiguous acronyms are also used in WS 7.	Define the TM acronym	The SAP has been revised to provide a definition of TM and to clarify the individual identified as QAM.
18.	0130	16	WS7		As noted above for WS 6, the requirement to prepare "field change requests for any major or minor changes in sampling procedures that occur as a result of conditions in the field" is impractical and overly burdensome for any minor change. USEPA should provide specific guidance on what constitutes a change requiring approval.	Include specific guidance on what constitutes a change requiring approval for "...significant changes in sampling procedures…"	See response to comment 17.
19.	0144 - 0145	18	WS8		Training records for US Magnesium Contractor Training are maintained by US Magnesium. USEPA "Field Logbooks" do not serve as documentation for the completion of the Contractor Training.	Delete this requirement from the SAP	The text has been revised to clarify documentation requirements for training records.
20.	0154	20	WS9	Table 9-1	Table 9-1 has the following errors and omissions: • Missing the Air-technical Breakout 1A Scoping Meeting, including the following presentation materials, sent to USEPA on 16 March 2012: o Revised Air Investigation Decision Flow Chart o Chlorine Balance Process Flow Diagram o Spray Dryer Process Flow Diagram		Worksheet #9 has been revised to reflect these additional documents, as available.

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
					○ Air Dispersion Analysis Overview - AERMOD Simulation Purpose And Inputs ○ US Mag Stack Test Data Summary ○ US Mag Candidate Stack Test Methods Summary ○ Ambient VOC TO-14 TO-15 Method Summary ○ ATI Meteorological Data Summary (Wind Rose) • Missing the draft agenda for Scoping Session 2 sent to USEPA by ERM 30 March 2012 • Missing the Air breakout Meeting 1-A Outcomes Memorandum that was sent to USEPA 4 April 2012 • The final agenda and slide deck for the Scoping Meeting Session 2 that was sent to USEPA 11 April 2012, not 17-20 April 2012 • The AERMOD modeling memorandum proposed for Phase 1 sampling program, the Phase 1 analytical methods memorandum was sent to USEPA on 13 April 2012, not 11 April 2012 • Missing the draft position paper from USEPA titled "DMA Sample - Collection-Processing Dry, Semi-Dry &-Saturated Surface Soil/ Sediment/Solid Waste" that was sent to ERM 1 May 2012 • Missing the RPD workbook of		

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
					historical duplicate and replicate samples used to calculate these RPDs and CVs that was sent to ERM 7 May 2012 • Site visit with USEPA/ERM technical team to identify potential air monitoring locations conducted on 22 May 2012. • Missing the DQOs for the Human Exposure Survey and Ecological Survey- Missing that was sent to ERM 27 June 2012 • Provided the USEPA technical team and contractors with a user guide (EQuIS Online) and training for the project database containing all verified and validated historical data on 24 July 2012 • Missing the side-by-side review of analytical method QC and performance for the Test America SOPs and the CLP SOWs sent to USEPA on 3 August 2012 • Preliminary Draft Plan Maps listed as being submitted on 19 July 2012 were actually submitted on 9 July 2012 • Missing the USEPA comments on proposed Phase 1A sampling plan for air submitted on 9 July 2012 • Missing the draft agenda for 1 November 2012 Session 1A air breakout call technical call sent to USEPA on 29 October 2012 • Missing the summary of the analysis-		

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
					specific DMA issues sent to USEPA on 2 November 2012 • Missing the e-mail notifying USEPA that ERM will complete several items related to advancing the air DMA and scoping process for the Phase 1A air monitoring program sent to USEPA on 2 November 2012 • Missing the draft outcomes memorandum summarizing the Air Breakout Call held on 1 November 2012 sent to USEPA on 12 November 2012 • Missing the draft Phase 1A Air Quality DMA Work Plan sent to USEPA on 13 November 2012 sent to USEPA on 12 November 2012 • Missing the draft Air Breakout Call #3 Presentation Materials and Agenda sent to USEPA on 19 and 20 November 2012, respectively • Missing ERM's response to the 25 September 2012 USEPA Responses to ERM Questions Concerning Development of a Focused Analytical Method for Analysis of Hexachlorobenzene and Indicator Chemicals in Solid Media sent to USEPA on 20 November 2012 • Missing the submittal of ERM's complete set of met data, AERMET and AERMOD-related files as requested by USEPA sent on 3 December 2012		

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
					• Missing the submittal of ERM's Draft Human Exposure Survey Work Plan sent to USEPA on 21 December 2012 • Missing the submittal of ERM's Site-Wide Ambient Air PRI – Proposal (3) for the Phase 1A Sampling and Analysis Plan sent to USEPA on 2 January 2013 • Missing the submittal of ERM's draft Ecological Survey Work Plan sent to USEPA on 30 January 2013 • Missing the submittal of final scribe database including all historical data and final DMA data, as well as all relevant meta and QA/QC documentation, sent to USEPA on 31 January 2013 • Missing the redline strikeout version of the draft Air DMA Work Plan sent to USEPA on 8 February 2013 • Missing the proposed Air DMA WP Sample Design and Duration for the US Mag, Air DMA sent to USEPA on 26 February 2013 • The 19 February 2013 Pre-Discussion Materials were not provided to ERM prior to the 20 March 2013 Scoping Meeting • The receptor ranking analysis as described below for the case of the 288 receptor, 205 meter-grid in the Air PRI sent to USEPA on 18 March 2013 • Missing the Scoping Meeting (teleconference) held 6 March 2013 to		

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
					discuss Phase 1A analytical method modifications indicated by DMA results • The Scoping Meetings Summary Outcome Notes were sent to USEPA 8 March 2013, not 15 May 2013 • The 23 March 2013 reference to "Work planning materials" appears to be an internal USEPA transmittal and should be omitted from the table • Missing the Scoping Meeting (teleconference) held 4 April 2013 to discuss USEPA Suggested Phase 1A analytical method modifications memorandum of 25 March 2013 • Missing the USEPA's HH Exposure Survey Comments and Associated Materials provided to ERM by e-mail on 18 April 2013 • Missing the e-mail response to a list of the information needed to evaluate Method 680/8270-SIM for PCB analysis received from Dan Wall on 19 April 2013, sent to USEPA on 24 April 2013 • Missing the ERM Outcome Notes from the 4 April 2013 Phase IA Analytical Methods Chemistry/Analytical technical discussions submitted to USEPA 2 May 2013 • Add the letter to Ken Wangerud from David Abranovic US Magnesium general comments on the Scoping		

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
					Outcome Notes, sent to USEPA 21 May 2013 • Add the detailed comments on USEPA's revision to the Scoping Meetings Summary Outcome Notes sent to USEPA 7 June 2013 • Add the ERM's response to USEPA's HH Exposure Survey Comments and Associated Materials sent to USEPA 13 June 2013 • Add Technical Memorandum on the alternative PCB analytical method (Modified Method 680) sent to USEPA 13 June 2013		
21.	0190	26	WS10		This section should be entitled "Preliminary Conceptual Site Model"		The title has been revised as suggested. The original text notes that the CSM may be continuously updated as new information is acquired.
22.	0197	26	WS10		ERM agrees that the development of a CSM for the site is a critical step in the RI process and we believe that it is an iterative task that should be updated as new information is obtained. However, the level of detail and information presented in WS10 is over-reaching and goes beyond the level of detail required for Phase 1A. As such, review of this entire section is onerous and unnecessary for the purpose of the Phase 1A and the level of effort required for review would be better suited for a later stage of the RI process.	Revise entire WS10 as appropriate to present only the information that is necessary to define the Phase 1A problem definition and support the DQO process.	The EPA disagrees with this comment. Presenting a comprehensive review of site conditions and historical information is standard practice prior to implementation of an RI. The information presented in Worksheet #10 summarizes the EPA's current understanding of the site and provides a foundation for the design for all aspects of the RI, including Phase 1A.
23.	0202	26	WS10		Discussions of data gaps as they apply to the entire RI are premature and	The CSM concludes with the formulation of a Phase 1A	Conducting a comprehensive review of existing data concurrent with the

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
					inappropriate for the Phase 1A SAP. The background information presented is not clearly related to the formulation of a Phase 1A problem definition.	problem definition ~~identification of data gaps~~ and an overview of the anticipated investigation approaches for the RI.	development of project objectives and identification of data gaps is standard practice for the development of a CSM. Early phases of a project need to be developed considering larger, long-term program objectives. The data gaps identified in Worksheet #10 of the draft Phase 1A SAP (Section 10.6) provide a basis for the identification the overall objectives of the RI, as well as the specific objectives of Phase 1A of the RI.
24.	0229	26	10.1	Figure 10-1C	Figure 10-1C fails to identify major site features and includes abstract, unidentified labeling. All arrows should be identified in the legend. The perimeter of the Magnesium Plant should be identified, as should the brine holding "star" pond, the sanitary lagoon, the GSL intake canal, and Solar Evaporation Pond 1N, all of which are visible in this photograph. The names of site features should be consistent with terminology used elsewhere in the SAP. For example, the waste lagoons are called by different names elsewhere in the document. "Airshed" and "Historic GSL Shoreline" are neither site features nor business operations, as the description in the text on lines 229-230 of the SAP suggests.		Figure 10-1C is intended to be a general site overview. Changes to the figure were made as suggested, with some minor exceptions. The historic GSL shoreline is relevant because it shows how the Northeast Ponded Waste Lagoon lies within the boundaries of the historic GSL.
25.	0230	27	10.1	Figure 10-2	Characterizing the Site as sitting "on a natural spit of land that appears to be an alluvial fan extending from the Lakeside Mountains into the Great Salt Lake area" is	The Site (5-mi radius) includes the bed of the GSL, alluvial deposits from the Lakeside mountains, and the Lakeside	Aerial imagery and topographic data available for the study area indicate that the Magnesium Plant was built on a topographically higher area relative

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					erroneous. The Site (5-mi radius) includes the bed of the GSL, alluvial deposits from the Lakeside mountains, and the Lakeside Mountains. Portions of the Site occupy an apparent spit into the current bed of the GSL. Figure 10-3 does not show the Lakeside Mountains nor their 'alluvial fan' referred to in the text on line 232.	Mountains. Portions of the Site occupy an apparent spit into the current bed of the GSL.	to most of the surrounding shoreline of the GSL as shown in Figure 10-2. Geotechnical boring information (Dames and Moore, 1969) and geologic cross-sectional data (MWH, 2005b) show the presence of coarse grained materials characteristic of alluvial deposits mixed with finer grained GSL sediments beneath the facility. The text has been modified to clarify that the facility (rather than the "Site") was built on a topographic high.
26.	0233	27	10.1		The text should be revised as suggested. Based on a review of aerial photographs, the waters of Great Salt Lake are always present within the Site, if the Site is defined as the 5-mi radius around the Magnesium Plant.	The proximity of the Magnesium Plant to the waters of Great Salt Lake varies with fluctuating...	The text has been revised as suggested
27.	0277	26	WS10		This section should include a reference to the Title V permit and MACT standards that regulate air emissions from the site.	Air emissions released from the Magnesium Plant, <u>permitted under UDEQ Operating Permit #4500030001</u>, contain chlorine, hydrochloric acid, organic chemicals, and particulates that may contain adsorbed contaminants. <u>These emissions are consistent with the national emission standards for hazardous air pollutants (NESHAP).</u> <u>The NESHAP implements section 112(d) of the Clean Air Act and requires all major sources to meet HAP emission standards</u>	The Title V operating permit and the limits on releases set by the permit are already discussed later in this section.

ATTACHMENT 4
EPA Responses to ERM Comments on May 2013 Draft Phase 1A SAP

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
						reflecting application of the maximum achievable control technology (MACT) for primary magnesium refining facilities. (EPA, 40 CFR Part 63, Docket ID No. OAR-2002-0043; FRL-RIN 2060-AH03).	
28.	0298-0299	28	10.1		The statement that "not all releases at and from the Site are known at this time" is speculative and should be deleted.	Omit lines 298 to 299	The wording has been revised to more accurately reflect the intent of the sentence, as follows: "Potential sources of releases have not yet been comprehensively mapped or identified across the Site."
29.	0302	28	WS10		The reference to the Main Ditch being called the "Red River" is not relevant to this document and should be omitted.	The Main Ditch is approximately 2,800 feet in length and is ~~also called the "Red River" due to~~ an earthen red color.	The text has been revised as suggested.
30.	0307				The SAP incorrectly designates the Inactive Waste Pond as occupying 1200 acres. USEPA Doc. Record, § 2.2.1 states that it is approximately 815 acres which is also an over estimate, SCS Engineers, Technical Comments on the Proposal to Include US Magnesium (Rowley, UT) Plant on the National Priorities List, dated Nov. 21, 2008 estimated 725 acres.	Include the correct area of the Inactive Waste Pond and add a reference.	The text has been revised to indicate that the Inactive Waste Pond occupies approximately 834 acres of land. The acreage was verified using GIS.
31.	0308	28	10.1		The Northeast Ponded Waste Lagoon received wastewater via the Main Ditch, not the Central Ditch.		The text has been revised accordingly.
32.	0312	28	WS10		Include a reference to the June 2012 "REPORTABLE-EVENT OF ACID-POND BREACH AT US MAGNESIUM SUPERFUND SITE" from David Gibby to		The reference has been included as suggested.

ATTACHMENT 4
EPA Responses to ERM Comments on May 2013 Draft Phase 1A SAP

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
					Ken Wangerud.		
33.	0313	30	WS10		The water sampling results from the DMA indicated that the water in these seeps is neutral and may not be coming from the upgradient ponds.	Please include a reference to the data that support this statement, or omit it.	The text has been revised to provide the following clarification. In brief, the water sample (DMA-W-PRI07-1) collected during the DMA from the Inactive Waste Pond shows the seeps into the inactive waste lagoon have a pH of 5.37. The data indicate the water contains similar constituents (e.g. volatile organics and halo acetic acids) to those found in the Active Waste Lagoons (ERM DMA Lab Results Report, 2013). These data suggest that seeps into the Inactive Waste Lagoon potentially emanate from the Active Waste Lagoons.
34.	0322-0325	29	10.1		The descriptions of accessibility to different areas within the Smut piles are irrelevant and should be deleted. Accessibility is not described for any other area.		The text has been revised to remove reference to potential access issues.
35.	0326	30	WS10		The wastes disposed at the Barium Sulfate Area, a.k.a. Casthouse Residue Treatment/Disposal area, were from the historic use of a barium-containing flux during casting. Barium has never been used for sulfate removal. The Barium Sulfate area is a permitted, closed repository where process material containing barium was treated and disposed in the early 1990s. Engineered earthen disposal cells were constructed to contain waste material containing barium. The waste was flooded with brine (which contains high	The Barium Sulfate area is a permitted, closed repository where process material containing barium was treated and disposed in the early 1990s. Engineered earthen disposal cells were constructed to contain waste material containing barium. The waste was flooded with brine (which contains high concentrations of sulfate) to immobilize any barium present by conversion to insoluble barium	This section has been revised to include several of the suggested historical clarifications.

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
					concentrations of sulfate) to immobilize any barium present by conversion to insoluble barium sulfate. After treatment, the cells were capped with three feet of clean, native soil. The disposal cells were permitted by the Utah Department of Environmental Quality - Division of Water Quality under Permit No. UGW450004, and groundwater monitoring wells were installed around the perimeter of the containment cells to monitor water levels and water quality around the cells during and after treatment.	sulfate. After treatment, the cells were capped with three feet of clean, native soil. The disposal cells were permitted by the Utah Department of Environmental Quality - Division of Water Quality under Permit No. UGW450004.	
36.	0329	30	WS10		Gypsum has and is currently used as landfill cover.	This waste disposal area receives solid and other unidentified waste from the Site, and uses gypsum waste as a cover material.	The text has been revised as suggested.
37.	0343	29	10.1		Surface water runoff is not "present across the site." USEPA should revise the description or provide the basis for this assertion. USEPA should also clarify what differentiates "surface water" from "wastewater."		The text has been revised to clarify the EPA's understanding of surface water runoff at the Site.
38.	0349	30	WS10		All air emissions at the site are permitted and comply with the MACT standard for primary magnesium production. All discussion regarding the air shed should note this fact.	"..., although the facility complies with the MACT standard for primary magnesium production, the air shed of the Site is ~~also~~ suspected to periodically be ~~known to have been~~ impacted by these ~~with~~ permitted releases."	Section 10.3.3 (beginning on line 1104) already describes the permit and the MACT standards. Whether releases are permitted or not is irrelevant in this section of Worksheet #10.
39.	0352	30	10.2		Issues 1-6 are not valid to the objective of the Phase 1A. As answers to these issues are not objectives of the Phase 1A, most of the supporting text is not required (see	Omit lines 358 to 376	Conducting a comprehensive review of site conditions and historical information is standard practice prior to implementation of an RI. Therefore,

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
					comment to line 197 and 207).		the information presented in Worksheet #10 is considered appropriate for describing the preliminary CSM and the overall premise for the site-wide remedial investigations. No change has been made to the text.
40.	0377	30	10.2.1		This section appears to be missing information regarding the primary surface features, instead focusing almost entirely on hydrology. At minimum, text describing the topography and vegetation should be added.		The topography at the Site is described earlier in the CSM as it relates to Site features. The ecological habitat survey will provide a summary of the types of vegetation are present at the Site.
41.	0379	30	10.2.1		The text in the sentence starting on this line refers to a "single perennial stream," which we believe refers to the Skull Creek Diversion. This characterization is contradictory to the 2004 MWH Groundwater Characterization Report, which states that "No perennial streams flow through or near the Plant site." Furthermore, as noted later in the SAP (see line 568) the surface water flows in the diversion ditch are mostly seasonal and only occur when being actively pumped.	"Seasonal surface water flow usually occurs from the nearby Lakeside Mountains as a result of seasonal springs, seeps, and snowmelt, but only a single ~~perennial~~ intermittent stream (sourced in the Skull Valley and Timpie Springs far to the south) flows near the Magnesium Plant, passing immediately adjacent to and around the Southeast and Northeast Ponded Waste Lagoons."	The text has been revised as suggested.
42.	0380	30	10.2.1		Revise wording as suggested. Surface water flow does not "usually" occur from the Lakeside Mountains.	Surface water flow ~~usually~~ may occasionally occur from the nearby Lakeside Mountains…	The text has been revised as suggested.
43.	0381	30	10.2.1		The source of the water at Timpie Springs is perennial, but flow around the plant is seasonal, as needed. Water is primarily pumped in the spring during periods of runoff from the Stansbury Mountain range.	The text needs to be revised accordingly.	The text has been revised as suggested.

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
					Water flows through the diversion ditch to the Great Salt Lake only when being actively pumped.		
44.	0400	31	10.2.1		The sentence starting on this line (the final sentence of the paragraph) is unclear - please revise the wording to better explain the relationship between the 5-mile radius drawn on the aerials and the ponded waste lagoons/GSL shoreline	The text needs to be revised accordingly.	The text has been revised to indicate that the five mile radius has been drawn onto the aerial photographs showing the Study Area.
45.	404	31	10.2.1		This sentence is hypothetical and is not appropriate for a fact-based technical document. There have been no documented impacts to the GSL and surrounding mud flats attributed to Northeast Ponded Waste Lagoon.	Please include a reference for these statements, or omit lines 404 to 408.	The text has been revised as suggested.
46.	0409-0412	31	10.2.1		This paragraph should be deleted or significantly revised. Storm water quickly infiltrates into the ground or evaporates and runoff from waste management areas is not expected.	USEPA should delete this paragraph or provide the basis for their assertion that storm water runoff from waste areas flows onto adjacent areas or mudflats.	The text has been revised accordingly.
47.	0427-0428	31	10.2.2		Only a portion of the 5-mile radius Site is located on a former peninsula.	The text should be revised to reflect that portions of the Magnesium Plant and waste management areas are located on a former peninsula. A figure should be provided showing the location and extent of the former peninsula (or "spit" as referred to in Section 10.1).	The text has been revised to indicate that the Magnesium Plant (and not the entire Site) is located on the peninsula. The title of Figure 10-3 was revised to clarify that the aerial photograph shows the topographic high upon which the Magnesium Plant was constructed.
48.	455	32	10.2.3		The website link embedded in the text on this line did not direct the reader to a functioning website.	Correct the website address	The URL address has been corrected.
49.	0462	32	10.2.3		USEPA should identify the basis for the		The regional scale of the soil mapping

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					assertion that the soil classification within the ponded waste lagoons "may be an artifact of the manner in which the map was drawn," and why other soil classifications across the Site would not be similarly affected.		effort conducted across the Site suggests that some minor misclassifications could exist because aerial photographs and other remote sensing imagery may have been used to prepare the maps where access was not possible. A detailed soil map consistent with the available regional studies has not yet been produced. The sentence starting on Line 461 was revised to read as follows: "Beneath the ponded waste lagoon, the USDA map indicates presence of Skumpah silt loam. Whether this material remains within or beneath the ponded waste lagoon is unknown."
50.	0479	33	10.2.4		Replace "radically" with "radially."	…flows radially away from the center…	This typographical error has been corrected.
51.	0481	33	10.2.4		Revisions suggested to reflect the fact that liners are present on site adjacent to certain waste ponds, and appear to be deflecting groundwater flow	"Other factors contributing to groundwater recharge and discharge patterns may include the topographic high on which the Site is located, the presence or lack of liners under or adjacent to conveyance ditches and ponded waste lagoons, the silty clay unit beneath the upland portion of the Site, potential chemically indurated pans under the waste piles and lagoons, changes in wastewater elevations within the ditches and ponded waste lagoons, and the elevations of GSL.	The text has been revised as suggested.

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52.	0491	33	10.2.4		Please provide the correct citation (there are two MWH documents listed in the References for 2004)		The citations for MWH documents have been revised to distinguish the two 2004 references.
53.	0500	33	10.2.4		Please provide the correct citation (there are three MWH documents listed in the References for 2005)		The citations for the MWH documents have been revised to distinguish the two 2005 references.
54.	0505	33	10.2.4		The upper end of the range of vertical gradients in this sentence (-0.04 ft/ft to -0.18 ft/ft) is not consistent with what was provided in the 2004 MWH Groundwater Characterization Report (-0.04 ft/ft to -0.16 ft/ft).	Please review your source and revise the statement as needed.	The text has been revised to reflect the results reported on Table 4.2 of the 2005 MWH Report. In this table, seasonal water level measurements indicate that vertical gradients measured at the Site range from -0.71 to -11.48 ft/ft.
55.	0511	33	10.2.4		Please provide the correct citation (there are three MWH documents listed in the References for 2005)		The citation has been corrected.
56.	0518	34	10.2.4		Please provide the correct citation (there are three MWH documents listed in the References for 2005)		The citation has been corrected.
57.	0521-0522	34	10.2.4		The assertion that "down gradient of the ponded waste lagoons, increases in water levels occur in early winter and fall, possibly due to leakage of wastewater to groundwater in these areas" should be supported by additional description. It is unclear from Figure 10-10 how leakage of wastewater, which is present nearly continuously, could lead to increasing groundwater levels in the early winter and fall.		Specific piezometers downgradient have been identified in the text.
58.	0524	34	10.2.4		The statement "there are no piezometers	The text needs to be revised	Well LF-01 is located on the eastern

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
					within the Magnesium Plant at or near the center of the groundwater mound where the potential for downward gradients is the highest" is misleading. While there are no piezometers, monitoring well LF-01 is present in the apparent groundwater mound area, from which water level data can be collected.	accordingly.	edge of the mound identified in the MWH 2006 report created by Plant operations and does not provide adequate hydraulic control to define the extent of the groundwater mound. As shown on Figure 10-11 of the draft Phase 1A SAP one well, MW-01, is present on the facility. The text has been revised accordingly.
59.	0536	34	10.2.4		Referenced to potential seeps into the south buffer area where there are no indications (either color or pH) releases from the ponded waste lagoons is hypothetical and not appropriate for a fact-based technical document.	Include a reference for this statement, or omit lines 537 and 538.	The text has been revised accordingly.
60.	0537-0538	34	10.2.4		We assume the reference to the "Southwest Ponded Waste Lagoon" intends to refer to the Southeast Ponded Waste Lagoon. The reference to seepage into the Buffer Area South (PRI 14) from wastewater is somewhat speculative, because the seepage is clearly visible in 1978 and 1985 aerial photographs, which was prior to construction of the Southeast Ponded Waste Lagoon (PRI 5).	The sentence on lines 536 - 538 should be deleted as it is speculative and unsubstantiated by data.	The reference to the Southwest Ponded Waste Lagoon has been corrected. Available information supports the conclusion that that seepage into the Buffer Area South has occurred in the past and may occur in the future. The text has not been revised in response to this comment.
61.	0539-0540	34	10.2.4		Wastewater elevations were measured from May 2004 through May 2005. See MWH Annual Groundwater Monitoring Report Table 2-4 (2006).		Wastewater elevations from three gauging stations were reported monthly between December 2004 and May 2005 according to Table 2-4 of the MWH Annual Groundwater Monitoring Report (MWH, 2006). Groundwater fluctuations were generally less than 0.5 feet at all stations. The text has been revised

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							accordingly.
62.	0553	34	10.2.4		Rewording warranted	"No monitoring wells have been installed and no groundwater ~~wells~~ or surface water samples have been ~~installed or~~ collected to characterize flow and surface water chemistry on and within the Gypsum Pile."	The text has been revised as suggested.
63.	0555	34	10.2.4		Rewording warranted	"Similar to the ditches and the ponded waste lagoons, the wastewater being discharged to the Gypsum Pile may ~~be contributing water to the~~ also cause groundwater mounding locally near the discharge point. The ~~amount of water being lost to groundwater and the~~ overall impact of the Gypsum Pile discharge to the groundwater flow regime has not yet been evaluated.	The text has been revised as suggested.
64.	0568-0575	35	10.2.4		Flow within the Skull Creek Diversion is controlled by pumping at the north end of Skull Valley, near Interstate 80. Water is primarily pumped in the spring during periods of runoff from the Stansbury Mountain range. Water flows through the diversion ditch to the Great Salt Lake only when being actively pumped.	The sentence on lines 571-574 should be deleted as it is speculative and not relevant to the Phase 1A objective for surface water.	The sentence has been revised to indicate that the influence of the Skull Creek Diversion on groundwater and surface water quality and flow characteristics at the Site has not yet been evaluated.
65.	0578-0582	35	10.2.4		The sentence "Water levels and quality may have an influence on the interaction of the waters in these unlined barrow ditches with potential sources of water and surrounding environmental media" should	Omit lines 578-582	The paragraph has been revised accordingly.

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					be deleted as it is vague (what are the types of various 'water' discussed within this sentence), speculative, and not relevant to the Phase 1A DQO of COPC selection. The sentence "Water level measurements have also not been performed in these water features" should also be deleted as it is not relevant to Phase 1A.		
66.	0580-0581	35	10.2.4		The sentence "No sampling of surface water and sediments from these Barrow ditches has been performed' is not factual. The barrow pit north of the northwest ponded waste lagoon (PRI 6) was sampled for surface water, sediment, and biota (brine fly larvae and adults) in 2003 as part of the Focused Ecological Risk Assessment. Two locations were sampled.	Omit lines 580-582	The text has been revised to reference the sampling conducted in 2003 by Parametrix.
67.	0583-0599	35-36	10.2.4		The discussion of "Low Areas" is confusing and consists mostly of speculative assertions that are no supported by data. The Low Areas appear to include PRI 8 and the bed of the GSL (PRIs 14 and 15). Of these locations, surface water sampling is only proposed by USEPA at PRI 14 (Figure 14-14). It is therefore unclear why discussions of these other areas are relevant to the surface water description in this WS.	The discussion of wildlife observations on lines 598 - 599 should be deleted as it is not a description of surface water.	The section has been revised to remove lines 598 to 599 and to clarify the discussion of the Low Areas. A discussion of Low Areas is appropriate and was used during planning of the Phase 1A activities.
68.	0593	35	10.2.4		There is no "Southwest Ponded Waste Lagoon" identified at the Site.	Low areas north of the Northeast Ponded Waste Lagoon and south of the Southeast~~west~~ Ponded Waste Lagoon periodically fill with water.	The text has been revised as suggested.
69.	0601	36	10.2.4		Delete "GSL-basin," as these features are	A network of developed ~~GSL-~~	The text has been revised as suggested.

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					man-made and not features characteristic of the Great Salt Lake basin.	~~basin~~ evaporation ponds and ditches...	
70.	0605-0606	36	10.2.4		The sentence "No water quality sampling of surface water and sediments in these ponds and ditches has been performed" is not factual. Co-located sediment and surface water samples were collected from Solar Pond 1N during the October 2012 Phase 1A DMA. As described in Section 2.0 of the Final USEPA Work Plan, these samples were collected "in accordance with AOC Sec. IX Work to be Performed, paragraph 32, and Sec. XI Quality Assurance, Sampling, and Access to Information, paragraph 47. Accordingly, data collection will be in accordance with USEPA guidance, including Guidance for Data Usability in Risk Assessment."	Omit lines 605-606	The sentence has been deleted and replaced with the following text: "Co-located sediment and surface water samples were collected from Solar Pond 1N during the October 2012 Phase 1A DMA for soil, sediment, waste and water (EPA 2012). Some limited sampling was also performed in Solar Pond 2 by URS Operating Systems, Inc. (UOS) in 2003 (UOS 2004)."
71.	0622	36	10.2.5		This section provides a significant amount of detailed technical information that is not relevant to COPC selection but appears to be more related to the evaluation of COPC extent.	Rewrite the section to present information to support the Phase 1A sample design for PRI 17.	The section presents information that is relevant to a general understanding of changes in groundwater chemistry at the Site and relevant for the planning of Phase 1A and subsequent phases of the RI. Section 10.2.5 has been revised to include Subsection 10.2.5.1, *Groundwater Chemistry*, and Subsection 10.2.5.2, *Surface Water Chemistry*.
72.	0624	36	10.2.5		This sentence is hypothetical and is not appropriate for a fact-based technical document.	Please include a reference for this statement, a detailed description of the "reactions" referred to, or omit lines 624 and 626.	The sentence starting on line 624 has been deleted.
73.	0647	37	10.2.5		Water chemistry data from the ponded waste lagoons, including major cations and	Update the text to reflect current data or omit the sentence.	The sentence starting on line 647 has been deleted.

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					anions was collected during the DMA.		
74.	0648	37	10.2.5		Rewording warranted - the need for geochemical modeling has not been established	"Geochemical modeling has not ~~yet~~ been performed to demonstrate what the resulting water chemistry would be if local groundwater is mixed with wastewater."	The text has been revised as suggested.
75.	0677	38	10.2.6	Fig. 10-13	Figure 10-13 does not clearly show the heights of the wind rose measurements at each monitoring station. This information is critical to evaluating the information, due to significant variability in wind speed and direction with height.	Add monitoring height to each wind rose on Figure 10-13 and a reference to the different monitoring heights as an explanation of the apparent variability.	The wind roses from other stations outside the Site are intended only to illustrate the variability of wind patterns in the general area, and the heights of the stations outside the immediate study area are not needed to understand the general concept. The heights of the meteorological stations within the facility are shown on the figure.
76.	0678	38	10.2.6		The Site is not located in the Salt Lake Valley.	The Site lies in a semi-arid intermountain region of the ~~Salt Lake Valley~~ Great Basin.	The text has been revised as suggested.
77.	0684	38	10.2.6		The Site is referred to as semi-arid in line 678 then as arid in line 684.	The SAP should be consistent in the climate description. A reference for the annual precipitation (16.5 inches) should be provided, as this precipitation amount is greater than reported by the Western Regional Climate Center (http://www.wrcc.dri.edu).	The sentence starting on line 684 has been revised as follows: "While precipitation is relatively low in the GSL area (between 15.64 and 16.1) inches per year [http://www.wrcc.dri.edu; www.nws.noaa.gov]), areas bounding the Site receive even less precipitation. Precipitation in the Wasatch Range east of Salt Lake City can be considerable in winter, contributing to seasonal highs in GSL water levels."
78.	0736	39	10.3		This sentence is not factual. ERM has	Considerable sampling and	The EPA acknowledges the

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					obtained sufficient quality assurance documentation for the majority of the historical data. The only impediment to establishing the usability of these data is showing that the data are representative of current site conditions. Rewording these sentences as suggested is warranted.	analysis information is available and ERM has obtained the required quality assurance documentation for the majority of these data; however, USEPA does not consider these data usable for risk assessment purposes because they cannot be shown to be representative of current site conditions.	considerable effort that ERM has invested in collecting and documenting the existing data, and agrees that even when adequate documentation of data quality are available, the key question is whether the older data are representative of current site conditions. The text of Worksheet #10 has been revised to provide a brief statement as to why the historic data on environmental concentrations of site-related contaminants will not be used for COPC selection.
79.	0750	39	10.3		This sentence is not factual. All of the historical site data is included in the project data-base compiled and maintained by ERM. The data-base includes the available meta data associated with each sample results, as well as copies of all quality assurance documentation.	The text needs to be revised accordingly.	This sentence has been revised to clarify that the database was not used for preparation of the Phase 1A SAP.
80.	0756	39	10.3		This sentence is not factual. ERM has obtained sufficient quality assurance documentation for the majority of the historical data. USEPA was provided access to the project database containing all validated historical data, including quality assurance documentation in July 2012. Rewording these sentences as suggested is warranted.	The text needs to be revised accordingly.	See responses to comments 78 and 79.
81.	0758-0784	40	10.3		The discussion of existing/historical data referencing Tables 10-1 and 10-2 should be revised after these tables are generated from the project database (see comments for Tables 10-1 and 10-2). As provided in		Tables 10-1 and 10-2 were taken directly from existing site documents prepared by US Magnesium contractors and are adequate for descriptive purposes in support of the

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					the Draft SAP, Tables 10-1 and 10-2 do not illustrate the statements made by USEPA regarding the frequency of analyses and inadequacy of detection limits. Furthermore, the data used to develop these summaries, and the associated limitations, should be identified in SAP WS 13, as required by the USEPA UFP-QAPP Manual (USEPA-505-B-04-900A).		preparation of the Phase 1A SAP. As noted in the Tables they were condensed and adapted from Attachment D, Table 3.2 of the ChemRisk 2007 human health risk assessment included in the Finley Expert Report (2007). These tables are designed by ChemRisk to show the concentrations of chemicals found at the site and are not intended to address the frequency of analyses or adequacy of detection limits. The adequacy of the data and the reporting limits are discussed in the ChemRisk report. This information is not identified in Worksheet #13 because it is not anticipated that this data will be used for decision-making during the Phase 1A program. Worksheet #13 has been revised to include the use of historic data. See responses to comments 78 and 79.
82.	0785	40	10.3.1		This section provides a significant amount of detailed technical information that is not relevant to COPC selection but appears to be more related to the evaluation of COPC extent.	Rewrite the section to present information to support the Phase 1A sample design for soil and sediment.	Presenting this summary of historic data is useful in its own right (despite the potential limitations to the historic data), and in some cases the historic data were used to inform locations for biased sampling in Phase 1A.
83.	0786-0790	40	10.3.1		The discussion should be based on the validated/verified data in the project database, which includes all data from the referenced sampling reports.		See responses to comments 78 and 79.
84.	0792	40	10.3.1		This paragraph is focused on current information regarding the lateral and	Omit lines 791 to 796	This paragraph has been deleted.

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					vertical extent of contamination and is not relevant to this study.		
85.	0798-0833	41	10.3.1		D/F TEQ values reported in this section could not be duplicated using the project database. If included in the SAP, a discussion of TEQ values should identify whether the values are for avian or mammalian receptors, and how ND values are handled in the calculations.		The footnote for this section has been revised to clarify that historical TEQ values were calculated using mammalian toxicity equivalency factors (TEFs) and non-detected values treated as described on the relevant reference documents.
86.	0843-0844	42	10.3.1		Additional data for "areas further removed from the potential source areas" are available. For example, the USEPA START2 sampling events included samples located in the Buffer Area PRIs 13 - 15.		The text has been revised to include information available to the EPA as suggested.
87.	0890	43	10.3.1		The statement that "More data are needed to assess whether variability in the congener plots indicates significant differences in the PCB content of the soil/sediment at the waste areas." is not relevant to COPC selection.	The text needs to be revised to explain how this information is relevant to the Phase 1A RI or omitted.	The text has been revised as suggested.
88.	0926	43	10.3.1		The relevancy of congener and homologue profiles between different waste areas or higher and lower concentration areas in order to "fingerprint" different types of wastes to Phase 1A, or a subsequent phase of the RI should be explained..	The text needs to be revised to explain how this information is relevant to the Phase 1A RI or omitted.	The text has been revised as suggested. See the responses to comments 78 and 79.
89.	0935	44	10.3.2		Note that more recent groundwater monitoring data than provided in the April 2005 monitoring event report are available for the Site. The August 2006 Annual Groundwater Monitoring Report includes data from four monitoring events	This section of the SAP needs to be updated to reflect the most recent data or to indicate that the data summarized in the SAP do not represent the most current data.	The text has been revised to include results from the MWH, August 2006 Annual Groundwater Monitoring Report. The reference has been added to this section.

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					(April/May 2004, August 2004, February 2005, and May 2005), and are available in the project data base.		
90.	0940	44	10.3.2		As noted above, the second quarter data are not the "most recent" analytical data. Accordingly, the cited range of TDS values is incorrect (line 941). Furthermore, the range of values cited in the SAP does not reflect the range of TDS values reported in the cited report.	The text needs to be revised accordingly.	See response to comment 89.
91.	0949	44	10.3.2		As above, the cited alkalinity values, and average pH, TDS, and density do not reflect the most current data. Note that alkalinity values reported in the second monitoring event were not all greater than 123 ppm as stated in the SAP; that value represented the lower end of the range of results associated with the second monitoring round.	The text needs to be revised accordingly.	See response to comment 89.
92.	0966	45	10.3.2		The tally of historical HCB detections in groundwater samples stated in the SAP text is incorrect and should be revised - there were detections in samples collected from five wells (more than the 3 samples cited in the draft SAP text), and 78 samples were analyzed for hexachlorobenzene historically (more than the 26 samples cited in the draft SAP text)	The text needs to be revised accordingly.	See response to comment 89.
93.	0968	45	10.3.2		In addition to the wells specified in the draft SAP text, HCB was also detected in wells MW-5A and MW-5B.	The sentence should be revised to note that HCB was also detected in wells MW-5A and MW-5B.	The sentence has been revised accordingly.
94.	0976	45	10.3.2		The range of values cited in the SAP (0.0085 to 550 parts per quadrillion per	The text needs to be revised accordingly.	The text has been revised to reflect the results in the MWH Annual

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					liter) does not reflect the range of PCDD/PCDF values historically reported and included in the database (0.001126 to 0.85 ppt)		Groundwater Monitoring Report (2006).
95.	0995	45	10.3.2		Current research suggests that HCB has a half-life from 2.7 to 6 years in water and in the atmosphere, and may have a half-life of more than 6 years in soil (Mackay et al., 1992; Howard et al., 1991 as discussed in Nomination Dossier for HCB from Canada). Although the biological half-life of PCB congeners varies, a collective half-life of 2 to 6 years has been estimated for PCB mixtures (Shirai and Kissel 1996).	Omit HCB and PCBs from the sentence.	The text has been revised to recognize that PCBs and HCB do undergo slow degradation in the environment.
96.	1021	46	10.3.2		The need for confirmation of these aspects as part of the RI has not been definitively established.	"...the magnitude of vertical groundwater gradients is unknown ~~that will need to be confirmed during the RI~~."	Vertical gradients are very important for construction of the hydrogeologic CSM. The presence or absence of vertical groundwater gradients and surface water elevations can be used to understand if a relationship exists between wastewater, groundwater, and surface water. The collection of this information is essential part of Phase 1A activities because the data are needed for planning subsequent phases of the RI. Consequently, the text has not been revised in response to this comment.
97.	1032	47	10.3.3		Rewording warranted	Contaminants in the air at the Site largely result from <u>permitted</u> stack emissions, fugitive emissions from process systems, and fugitive dust from waste piles, such as the Gypsum Pile.	A discussion of the Title V operating permit and the emissions that are allowed under the permit is already presented.

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98.	1042-1044	47	10.3.3		This sentence speculates that under certain wind conditions chlorine gas emissions from the US Mag Main Stack can form "gas-clouds" due to the assumed dense-gas characteristics of chlorine. This statement is incorrect. Process data, supported by stack sampling data, clearly show that chlorine concentrations in the stack are not high enough to cause the plume to behave as a dense-gas.	Omit sentence.	The text has been revised as suggested.
99.	1052	47	10.3.3		The spray dryer stack emissions contain PM and HCl but are not primarily composed of them. They are primarily natural gas combustion products and additional steam and vapor from the wet scrubbers.	The text needs to be revised accordingly.	The text has been revised as follows: "Emissions from the Spray Dryer Systems contain natural gas combustion products and additional steam and vapor from the wet scrubbers. The emissions also contain particulate matter less than 10 microns in average diameter (PM10), particulate matter less than 2.5 microns in average diameter (PM2.5), and HCl. Emissions from the melt reactor include PM10/PM2.5, Cl_2, and possibly other organics."
100.	1054-1056	47	10.3.3		The sentence beginning "Dioxin/furans and potentially other . . is an oversimplified and inaccurate description of how these pollutants may form; it is not just the presence of carbon at high temperatures.	Dioxin/furans and potentially other chlorinated COPCs can be generated in the melt reactor due to the presence of chlorine, cyclic hydrocarbons, and a temperature within the range that promotes the formation of these compounds.	The text has been revised as suggested.
101.	1059	47	10.3.3		The CBS only scrubs the chlorine (anode) stream when a bypass mode is utilized.	The CBS periodically scrubs the anode gas stream from the electrolytic cells when the plant operates in bypass mode;	The text has been revised as suggested.

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102.	1068	47	10.3.3		An assumed efficiency of 98% is used for purposes of the chlorine mass balance. Stack testing has indicated efficiency in excess of 99%.	The text needs to be revised accordingly.	The text has been revised as follows: "Stack testing has indicated the efficiency of the CRB is 98% to 99% (DAQE-AN0716039-04, Oct. 5, 2004.)."
103.	1070	47	10.3.3		The CRB rebuild outage occurs every 10 years, not 5 years.	The text needs to be revised accordingly.	The text has been revised as suggested.
104.	1071	47	10.3.3		Shorter duration CRB shutdowns can also occur due to miscellaneous malfunctions or maintenance activities.	The text needs to be revised accordingly.	The text has been revised as suggested.
105.	1078	47	10.3.3		Ferrous chloride (reagent) is the feedstock for the CBS scrubber. Ferric chloride is the scrubber output. Both are storage capacity limited.	The text needs to be revised accordingly.	The text has been revised as suggested.
106.	1083	48	10.3.3		US Magnesium provides the Utah DAQ with periodic emission test reports in compliance with a testing schedule established by Approval Order DAQE-AN0716040-06 (Title V permit). The testing frequency required under the Title V permit is five years, however testing is required every 2.5 years under the MACT. As such, the facility is on a 2 year testing cycle. The February 2010 test referenced here is just one example.	To correctly characterize the facility "Stack Gas Monitoring Results," please insert the following or a comparable statement at the beginning of the paragraph: "The US Magnesium facility performs periodic manual-method tests of each stack emission point using USEPA Reference Methods in compliance with a schedule in the facility Approval Order (Title V permit and MACT reqierments). Under this schedule, each stack emission point is tested on two year intervals and the tests are reported to the Utah DAQ. While repeat tests have been necessary in some instances due to testing errors, each such test has shown the	The text has been revised to state that stack gas testing is performed every 2 years by the facility. A complete discussion of permit requirements and analytical methods is not germane to this section which discusses stack testing results.

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						facility to be in compliance with the permit emission limits. For example, one round of stack . . (continue the existing paragraph)."	
107.	1101	48	10.3.3		Windblown emission from the smut pile is highly unlikely due to the hydrophilic nature of smut. Dust generated from this area is likely due to loose native material on the haul roads.	The text needs to be revised accordingly.	The Smut piles do contain fine grained particles in areas where degradation has had time to occur. Therefore it is possible that windblown dust could be produced in these areas. The assertion that the hydrophilic nature of smut would limit particulate release is not supported with any technical evidence or information and accordingly the text has not been revised in response to this comment.
108.	1145	49	10.3.3		This section is not relevant to the primary purpose of the SAP, the selection of COPCs. US Magnesium has agreed to include Chlorine and HCl as COCs to be evaluated in the baseline risk assessment; therefor, the information presented in this section is not necessary.	Omit lines 1145 to 1164	The EPA disagrees with this comment. The nature of chlorine releases discussed in this section is a critical element of the CSM for the Site. The text has not been revised in response to this comment.
109.	1157	50	10.3.3		This "note" about compressing the timeframe for chlorine releases is speculation and not pertinent to the purpose of the SAP which is to identify COPCs.	Omit lines 1157 to 1159	The text has been revised as suggested.
110.	1163	51	10.3.3	Figure 10-26	This figure is not relevant to COPC selection because US Magnesium has agreed to include chlorine and HCl as COCs to be evaluated in the baseline risk assessment; therefor the information presented in this figure is not necessary. It	Omit Figure 10-26	See response to comment 108.

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					should also be noted that the State of Utah was notified in writing prior to the extended CRB maintenance outage identified on the Figure, and the work was carried out as authorized by the Title V air permit.		
111.	1186-1192	52	10.3.3		This paragraph includes discussion of the ALP met station operation. For various reasons, this short (20 m) tower, with no available QA information, is not a valid tool for this study. The text as written may suggest negative comparisons to the fully-instrumented, adequate height, PSD-certified and currently audited ATI tower.	Omit all mention of ALP tower from the report; it is not a valid tool for this study	The ALP data and other regional wind results are part of presenting a complete preliminary CSM for the Site and are relevant, descriptive information necessary to the understanding that changes in wind conditions are expected from different portions of the Site. The text has been revised to clarify the relevance of these data.
112.	1188	52	10.3.3		The ATI met tower was installed prior to 2009 and the initial PSD certification audit for the ATI tower was performed by MSI in August 2009.	Revise the sentence to include the correct date of construction	The text has been revised as suggested.
113.	1203-1208	52	10.3.3		Omit all references to the ALP tower for the reasons in the comment above.	Omit all mention of ALP tower	See response to comment 111.
114.	1216	52	10.3.3		The second sentence in this paragraph should indicate that AERMOD is USEPA-approved for regulatory and permitting purposes. This model is more than just "relatively sophisticated" and should be described properly for the SAP reader.	The AERMOD dispersion modeling system is approved by USEPA for air quality regulatory and permitting support, it allows for the evaluation of the impacts of releases from multiple sources . . (remainder unchanged).	The text has been revised as suggested.
115.	1263-1269	53-54	10.3.3		This paragraph misrepresents the US Mag stack emissions as having the potential for "dense-gas" behavior. The maximum technically possible concentration of	Omit these paragraphs.	The text has been revised to indicate that dense gas releases are not expected from the stack, but might occur from fugitive sources. The text does not

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					chlorine dispersed in the hot, buoyant stack gases, even during bypass events, cannot approach the threshold for dense gas behavior. No data or calculations have been presented that validate USEPA's characterization of emissions from the site as a "dense-gas." The mention that chlorine has a higher molecular weight than air as a justification is invalid and misleading (the particulate in the plume also has a higher molecular weight, but there is no expectation that a "dense dust cloud" will coalesce and drop outside the stack).		refer to the molecular weight of chlorine. Rather, the text states that the density of pure chorine is about twice that of air, which is why high concentrations of chlorine may behave as a dense gas.
116.	1270-1287	54	10.3.3		These paragraphs outline the USEPA work with the DEGADIS model as an alternative representation of "dense-gas" emission impacts. As outlined in the above comment, attributing dense-gas characteristics to the US Mag plume is invalid and misleading. DEGADIS (a model developed over 30 years ago and is no longer supported by USEPA) is not a valid tool for any aspect of the US Mag air study.	Omit these paragraphs.	See response to comment 115. Because dense gas releases may occur from fugitive sources, DEGADIS modeling results do have value and the description of this effort has been retained.
117.	1294	54	10.3.3		The "anecdotal" information in this section of the SAP, as well as use of subjective words such as "potentially harmful," is not appropriate for a fact-based technical document. The information in the bullet on line 1305 is not factual. The release was not documented to have occurred, and the referenced report was presumed to be made by a disgruntled or terminated US Magnesium employee. Respiratory	Omit lines 1294 to 1327	While the 'anecdotal' information of line 1305 is a matter of record in the NPL Listing Package, the EPA has removed the description of this incident from Section 10.3.3. The EPA recognizes that ERM/US Magnesium has stated that for the air pathway, chlorine and hydrochloric acid are chemicals of concern. The EPA believes the information presented in

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					difficulties experienced by employees due to chlorine gas that require treatment are recorded in the company injury log which does not show an entry for this incident. This report, as received by USM, was anonymous as opposed to "workers" indicated in this SAP. US Magnesium has agreed to include chlorine and HCl as COCs to be evaluated in the baseline risk assessment; therefor the information presented in this section is not necessary to "...provide additional justification for investigating human exposures..."		this section provides insight into the reason for these chemicals being of concern in the CSM, and warranting investigation of nature and extent of Cl/HCl releases and exposures.
118.	1363	56	Section 10.4		A critical review of this section was not conducted and a lack of specific comments does not indicate agreement with the text. However the purpose of this Risk Assessment section in the Phase 1A SAP is not clear. The baseline human and ecological risk assessment that will be conducted as part of the RI will provide a definitive risk characterization of site impacts, therefore review and reinterpretation of past risk assessment results is not appropriate here.	Omit lines 1572 to 1593	A summary of previous risk assessment results is appropriate in Worksheet #10. They are one component of the information that was reviewed to develop an understanding of the Site. The presentations are intended to be factual. The text does not offer any evaluation of the strengths or limitations of each assessment. The EPA agrees that the human and ecological risk assessment to be conducted as part of the RI will provide a definitive risk characterization of Site impacts and that the historical assessments will not be used as the basis for decision-making.
119.	1427	58	Section 10.4		It is not appropriate to include risk related conclusions regarding the site from opinion based expert witness reports. The cited reports are not quantitative risk	Omit lines 1427 to 1467	See response to comment 118.

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					assessments and were not prepared according to USEPA risk assessment guidance. Furthermore, this information is not relevant to the selection of COPCs.		
120.	1572	63	Section 10.4		It is not appropriate to include risk related conclusions regarding the site from an opinion based expert witness report. The cited report was not a quantitative risk assessment and was not prepared according to USEPA risk assessment guidance. The generic benchmarks and exposure assumptions used to derive the conclusions are likely not appropriate for the site therefore this information is not relevant to the Phase 1A SAP. Given that the RI has not been completed nor has a baseline risk assessment been conducted using data that the USEPA considers to be usable for risk assessment purposes, any conclusions regarding the risk profile at this site are premature and subjective.	Omit lines 1533 to 1593	See response to comment 118.
121.	1594	64	Section 10.5		There have been numerous discussions between ERM and USEPA regarding the specifics of the conceptual exposure model for the human health and ecological risk assessments. ERM believes that in the future, PRI-specific conceptual exposure models provide more detail as to the potentially complete exposure routes and receptors and will be a more useful tool as we move forward. However, for this preliminary phase of the RI process, one generic conceptual exposure model for the study area is acceptable.		The EPA agrees.

ATTACHMENT 4
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122.	1622	64	Section 10.5.1		Seasonal workers are not identified as an exposed population, but are present in Figure 10-32.		The text has been revised to add seasonal workers.
123.	1629	65	Section 10.5.1		ERM believes that 'episodic work' does not need to be identified as a separate human receptor for evaluation in the risk assessment. Any exposures associated with this receptor will be covered, to a greater degree, by other identified receptors; therefore ERM recommends that this receptor be removed from the CSM diagram. It should be recognized that the CSM, as presented, should be considered: (1) a 'draft' version, to be revised after the survey has been conducted and analyzed; and (2) a general depiction, as not all routes/receptors are relevant for every PRI/exposure unit.		The inclusion of 'episodic workers" is needed as part of the CSM, since such workers do exist and the EPA has been asked questions about whether such workers are at risk. The risk assessment will include a discussion of risk to such workers, but they will not be quantified as a separate exposed population.
124.	1700	66	10.6		This section discusses vague categories of data gaps associated with the RI rather than presenting project quality objectives (PQOs) that define the type, quantity, and quality of data that are needed to answer specific environmental questions, as stipulated in the UFP-QAPP Manual. Many of the data needs presented are premature and not germane to the scope of Phase 1A, which is COPC selection and human exposure and ecological surveys. The Phase 1A focus is on nature, not on extent. For example the first bullet regarding characterization of CERCLA releases is not an appropriate Phase 1A	This section should be retitled Problem Definition and be revised to clearly define the problem to be addressed and the environmental questions to be answered by the Phase 1A RI. Omit all mention of data gaps not relevant to Phase 1A and describe the Phase 1A PQO and data requirements necessary to support decisions for future phases of the RI.	The EPA disagrees with this comment. One purpose of developing a CSM is to help identify general data gaps that will need to be addressed during the project. The problem formulation for Phase 1A is provided in detail in Worksheet #11.

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					data need. Consistent with USEPA guidance, data gaps will be identified for the subsequent phases of the RI through the DQO formulation process.		
125.	1800	69	10.7		PRIs should also be consistent with a decision unit so that data are collected in a manner that allows decisions regarding the need for further evaluation and or remedial action.		The PRIs were developed as a useful strategy for guiding Phase 1A investigations, recognizing that final decision units for risk assessment and risk management may not be identical to PRIs. As already discussed in the text, exposure areas and decision units will be defined after efforts to collect data on human activity patterns and ecological habitats are complete.
126.	1808-1811	69	WS10, Sect 10.7		In the sentence "The PRI areas have been regrouped into areas based on the physical processes and potential sampling and analysis needs into separate DQO groupings for the purposes of identifying and addressing sampling and analysis needs in a more streamlined fashion then by each individual PRI area," it is unclear which PRI areas have been regrouped. Sampling strategies in WSs 11, 14, and 18 are presented on a PRI basis, not by PRI group.	Revise sentence to clarify which PRIs are grouped, and how that relates to sampling design.	The sentences starting on line 1808 through 1814 have been revised to better reflect the intent of the RI process as follows: "The PRIs outlined in this Phase 1A SAP are consistent with sources, depositions, media, and constituents as understood from the Preliminary CSM. After completion of activities specified in the SAP, including the human health survey and wild life survey, EPA may consider reformulating the RI exposure or decision units."
127.	1873	73	11.1		Rewording needed - The sentence is an overstatement	"Most aqueous releases and liquid wastes are ~~known to be highly~~ acidic (some with pH < 1); however cooling tower blow down is a significant wastewater stream that is not acidic and is discharged to the ditches and	The text has been revised as follows: "Most aqueous releases and liquid wastes are acidic (some with pH < 1), although cooling tower blowdown is a significant wastewater stream that is not acidic and is discharged to the ditches and pond."

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						pond,.."	
128.	1873	73	11.1		Exposure to low pH should not be considered as part of the CERCLA scope. However, exposure to other chemicals that may be in the waste stream that are sensitive to pH will be evaluated.		While pH per se is not a typical COPC, hydrochloric acid is used on-site and is listed as a hazardous substance, as is corrosivity and pH may be a good surrogate for one or both of these. Other reasons to collect pH data include: (a) aluminum aquatic life criteria are pH dependent under the CWA, and this may be considered an ARAR at some point; and (b) there is a pH standard under the CWA which may be determined to be an ARAR. The EPA expects the human and ecological risks assessments to provide at least a qualitative description of the potential adverse effects of low pH on human and ecological receptors.
129.	1893	73	11.1		In the phrase "...high-flow spring runoff, communication between ponded waste lagoons and fresh-water is possible." Please more clearly define what is meant by the terms "spring runoff" and "fresh-water." As commented previously, runoff is typically not observed at the site, and the intermittent flows in the Skull Creek Diversion are entirely due to pumping.		The text has been revised as suggested.
130.	1900-1902	74	WS11		This sentence is incomplete.		The sentence has been revised.
131.	1908-1909	74	WS11		In the sentence "[t]he effect of the Site and associated contaminants on human health is potentially significant, but cannot be adequately assessed because of the inadequacy of the contaminant	The effect of ~~the~~ Site ~~and associated~~ contaminants on human health of potential concern ~~is potentially significant~~, but cannot be adequately assessed at	The text has been revised as follows: "Effects of Site-related contaminants on human health cannot be adequately assessed at this time because of limitations and uncertainties in (1) the

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					characterization" USEPA should explain what effects to human health, other than associated contaminants, they are referring to. This statement should be revised to indicate that contaminant and exposure information are necessary to evaluate potential risks to human health.	this time because of the inadequacy of the contaminant characterization and exposure information.	existing data regarding Site contaminant levels and (2) human exposure values."
132.	1917	74	WS11		Define the difference is between "seasonal" and "temporary" aquatic habitat.		The text has been revised as follows: "The Site is within a transition area between the mudflat/playa habitat adjacent to the GSL and upland areas dominated by arid halophytic shrubs. The Site includes both habitat types, as well as seasonal aquatic habitat."
133.	2001	76	11.3.1		The AOC states "USEPA will determine the final Site boundaries based on the information generated during the RI/FS." The AOC does not include the option of expanding the study area during the RI/FS.	The text needs to be revised accordingly.	The boundaries of the study area may be expanded by the EPA at any time available data suggest additional data collection beyond the current study area may be needed to support risk assessment or risk management decision making. The existing text is correct as written. The text has not been revised in response to this comment.
134.	2011	77	11.3.1		Standard practice has "If….then" statements as the main focus of Step 5. This section should be rewritten to focus the discussion on the "if...then" statements and minimize the text.	-If the PRI is the appropriate exposure area, then select COPCs on a PRI-specific basis; conversely, if PRIs are not appropriate exposure areas, then refine the PRIs and conduct COPC screen on refined areas. -If Cmax is greater than the appropriate human health risk-based concentration (hRBC), then	The text already presents several "if….then" components of the data evaluation approach. Re-formatting the remaining text to a series of "if…then" statements is not considered to be necessary or useful. The text has not been revised in response to this comment.

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						select as a human health COPC in that PRI; conversely, if Cmax is equal to or less than hRBC then eliminate as a human health COPC in that PRI. - If Cmax is greater than the appropriate ecological risk-based concentration (eRBC), then select as an eco COPC in that PRI; conversely, if Cmax is equal to or less than eRBC then eliminate as an eco COPC in that PRI.	
135.	2024-2026	77	WS11		This sentence should be revised to clearly indicate that COPCs will be selected on a PRI basis. If this is not true, then USEPA must define the basis on which COPCs will be selected.	...preliminary remedial investigation (PRI) areas were identified as the basis for COPC selection based on the expected similarity…	The text has been revised to clarify that COPC selection for solid media will be performed on a PRI basis.
136.	2047 - 2114	78-79	11.3.1		Discussion of sample size adequate for Cmax is confused by the discussion of exposure area. At this point in the process, we must agree that the PRI is a reasonable approximation of exposure area for both human and ecological receptors. If we are not willing to make this assumption, a statistical design makes no sense. It should be recognized that this assumption has uncertainties associated with it. For example it may over- or underestimate the number of samples needed for human and ecological receptors, is because exposure areas may be larger or smaller than individual PRIs, necessitating more or less samples to reach Cmax. However, the way it is handled now is confusing, especially	Simplify this discussion to focus on the technical basis of the sample size of 14 and eliminate discussion on small versus large home ranges. If necessary, include a short uncertainty discussion regarding the potential for under- or overestimating the sample size. Remove the discussion regarding the addition of 2-4 samples. If there are any PRIs that have extra samples added to account for small home range, please remove.	The sample size needed for a decision unit is independent of the size of the unit, be it a PRI or some alternative area. The discussion of sample size is general and makes no assumptions about size of decision units. The distinction between large home range and small home range receptors is not related to the size of the home range, but to the risk characterization approach used for each, and the quality of the data set that is needed to support reliable COPC selection for each. The existing text clearly explains that the addition of 2-4 biased samples is a way to help limit the size of the data set needed for COPC selection for small

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					as it relates to species with small home ranges. Just adding 2-4 more samples as a way to address this concern is not adequately justified or supported. It is also not clear how this influences sample size as discussed in WS14 and WS18.		home range receptors, avoiding the need for increasing sample size beyond that currently planned.
137.	2073	78	11.3.1		The statistical development of the sample size of 14 assumes that the 14 samples will be placed randomly. This is important as the random nature of the sample locations ensure that the data are independent. There is no discussion in later sections (see line 2137) regarding the need for random placement of samples. While a purely random placement of samples is preferred as there is no need to know the underlying distribution of the dataset, a random systematic grid can also be used if it is clear that the contamination is not distributed in a uniform pattern across the site. A random systematic grid is where the first grid node is randomly placed and then the systematic grid is laid down from that random first point. It is unclear if the systematic grid used for the soil and sediment sampling is based on a random systematic design, or if the grid was placed judgmentally. If the latter is true, then the underlying statistical assumptions on which the sample size estimation are based are violated.	Clarify and add additional language regarding the statistical basis for the sample grids proposed for each PRI.	The text has been revised to more clearly explain the approach and rationale for the placement of sampling grids in each PRI.
138.	2075-2077	78	WS11		In the note at the bottom of Page 78, USEPA should identify when and how the skewness of analyte distributions will be		The text already states that this assessment will be performed as part of the Phase 1A data evaluation process.

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					evaluated, the criteria for collecting additional samples for COPC selection, and under what RI phase these additional samples would be collected.		The text has been revised to be more specific as to how the potential need for additional samples will be recognized, and to indicate that the collection of such samples would likely occur in the next round of sampling.
139.	2122	80	11.3.1		It is agreed that a comparison to background can be conducted after the COPC selection of Phase 1A. However, characterization of naturally occurring and ubiquitous anthropogenic compounds is critical so that the RI and the FS can focus on those issues that are due to site -related releases. It is recommended that background characterization be addressed in Phase 1B and not a later date.		The EPA agrees that a consideration of background characterization should begin as early as Phase 1B. This is stated clearly in Section 11.3.1 (Step 7). The EPA will seek input from ERM on steps that are recommended for inclusion in Phase 1B.
140.	2143	80	11.3.1	sensible	The need for subsurface samples in many of the PRIs listed is unsupported. In PRIs where wastes may be buried, as in the landfill, some subsurface sampling is considered appropriate and was agreed to in the scoping process. However, in other PRIs, such as the ditches, lagoons and gypsum pile there is insufficient evidence/rationale provided that subsurface sampling is necessary for COPC selection. The facility has been a magnesium metal manufacturing operation since the facility has been in operation, with relatively uniform basic processes and waste streams. Although the electrolytic cell technology used at the facility has been reconfigured several times over the years, these changes	Provide detailed technical rationale for subsurface sampling in each PRI where included, or omit these samples from the Phase 1A SAP.	The text already provides an explanation for why such samples are needed, but the text has been revised to clarify the rationale. Note that it is not necessary to provide affirmative evidence that there are differences in either the types and/or the levels of contaminants as a function of depth, but only to have a reasonable expectation that such differences might exist. Expectations articulated by ERM as to whether such changes are or are not likely to occur are only expectations. The EPA believes decisions should be based on data, not expectations, whenever possible. See the response from the EPA to ERM on

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					have not resulted in significant changes to the waste streams. USEPA has not presented specific information to support the assumption that historical waste streams are likely to have been significantly more concentrated or been comprised of different contaminants, therefore subsurface sampling proposed for many of the PRIs is not adequately supported. Furthermore, if the USEPA would like to sample sediments representative of the historic waste, the inlet area of the Old Waste Pond (PRI-7) is a more practical location to do this. Waste in this area represents the waste stream from initiation of plant operations to 1986 when use of this pond stopped.		the 21 May 2013 letter for additional discussion of this point.
141.	2147	80	11.3.1		It is unclear what "changes in the magnesium production process" are being referred to here. The only notable change in production process that occurred was the introduction of redesigned electrolytic cells that would reduce the amount of D/F produced in the electrolytes process by decreasing the oxygen available in the off-gas system. The old waste pond (PRI7) received the waste generated when the old cells were operational; therefore surficial samples from this area are representative of historical magnesium production process. The rationale presented does not adequately support the need to collect subsurface soil, sediment, and waste samples, given the high cost and health and	Please include a detailed fact-based rationale for the collection of subsurface samples from the current waste ponds (PRIs 5 and 6) or omit these samples from the Phase 1A SAP.	The text is referring to the information ERM presented the EPA during Scoping Meeting 2 regarding the history of changes that have occurred at the Magnesium Plant over time. However, even if no known changes had occurred, that would not negate the need for borings to investigate the potential that subsurface concentrations might be substantially higher at depth that at the current surface. If this were found to be true, a decision about COPC selection might improperly exclude an analyte that may require further characterization. See the response from the EPA to ERM on the 21 May 2013 letter for

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					safety risks associated with the collection of many of these samples.		additional discussion of this point.
142.	2147	80	WS11		Historical waste release rates of COPCs may have been greater or lesser, depending on the processes employed and production rates and will vary by COPC.	...historical waste release rates of COPCs may have been greater or lesser in the past...	While it is true that release rates might have been lower in the past than the present, this would not be expected to lead to a case where subsurface contamination is higher than surface contamination. The text has not been revised in response to this comment.
143.	2148	80	WS11		The term "more highly concentrated" should be deleted. The identification of older wastes as "more highly concentrated" is speculative, overly general, and is not supported by data for all COPCs in all PRIs. For example, USEPA states in line 837 Section 10.3.1 of WS 10 that " no vertical trends in concentration were noted."	The text needs to be revised accordingly.	Existing data are not sufficient to conclude that there are zero cases of an analyte being more highly concentrated in subsurface that surface samples. The section referenced by ERM from Worksheet #10 refers to the results from a single sample in the gypsum pile and analyzed for HCB. Clearly, this one sample does not prove that vertical gradients do not exist anywhere on-site. As noted above, the EPA does not require affirmative evidence that pattern of higher concentrations at depth do exist to justify collection of depth samples, only a reasonable expectation that such patterns might exist. The text has been revised to state that the older waste may potentially have been more highly concentrated.
144.	2153	80	WS11		Subsurface soil samples should not be collected unless there is reason to believe there are human or ecological exposures to subsurface soils. The specific (and only) objective of the Phase 1A soil investigation	Provide detailed technical rationale for subsurface sampling in each PRI where included, or omit these samples from the Phase 1A SAP.	The DQOs for solid media have been revised to provide further clarification of why inclusion of depth samples is an appropriate requirement for creating a data set for COPC selection.

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					is to obtain sufficient data to support identification of COPCs *for human and ecological receptors* (see lines 1957-1958, WS 11). The proposal to collect subsurface samples in areas where human and ecological receptors are not suspected to be present (e.g., in deep sediment in the middle of wastewater ponds, in deep sediment beneath wastewater ditches) is not germane to the objective of Phase 1A. There is no basis for collecting subsurface samples presented in DQO steps 1 through 6. As a nature and extent question, depth-profiling within waste management areas may be appropriate for consideration during Phase 1B, but not Phase 1A.		Worksheet #14 also provides detailed rationale for collection of the subsurface samples.
145.	2164	81			Unless there is specific rationale presented (see comment for line 2153), it is premature at this point to assume that subsurface exposure scenarios may require assessment. Until the exposure survey and the problem formulation phase of the risk assessment are completed, it will be unknown as to whether subsurface exposures are relevant, and to what depths.	Omit all references to assessment of subsurface exposures from the Phase 1A SAP for those samples where there is not technical rationale.	See response to comment 144.
146.	2168-2170	81	WS11		As stated previously, ERM opposes collecting subsurface samples at most PRIs. The evaluation to determine "if subsurface concentrations are substantially higher than those in surficial samples" needs to be defined and described according to the DQO process. The evaluation presented appears to be subjective. There is no specific statistical	Omit all references to the determination if subsurface concentrations are substantially higher than those in surficial samples from the Phase 1A SAP.	See response to comment 144. The text already states how the data will be used. The EPA has not yet developed quantitative criteria for determining if additional subsurface sampling may be required, either for establishing the nature and extent of contamination or to support risk assessment activities. If such sampling is considered to be

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					test identified for use in making this evaluation, and there is no discussion of whether the proposed sampling design would support a meaningful evaluation. Comparing surface to subsurface concentrations is not stated as an objective of the investigation, and does not appear in DQO Steps 1 through 6.		needed, the basis for that need and the statistical basis of the additional sampling will be provided in the Phase 1B SAP.
147.	2176	81	11.3.1		There is no one location where a clear discussion of the sample design for each PRI is presented. Detailed rationale behind the placement of the grid, grid size, and the addition of biased samples should be included. This discussion is extremely limited and the most important part of the SAP. Currently one must review WS11, WS14, and WS18 to try to understand the sampling rationale. In contrast WS10 is exceedingly detailed and dense and includes too much detail that is not relevant to the purpose of the SAP.	Present a complete detailed discussion of the sample design for each PRI, suggest including in Step 7 of the DQOs.	Worksheet #11 has been revised to provide an overview of the general sampling scheme for sold media. In brief, a total of 14 samples are distributed in a systematic grid, and a limited set of additional biased samples are added as needed to ensure that areas suspected to be potentially at the high end of the distribution are included. Additional details on the sampling design for each PRI are provided in Worksheet #14 and Worksheet #18.
148.	2194-2195	81	11.3.1	NA	This sentence is incorrect; all analyses are not required in all samples.	The text needs to be revised accordingly.	The text has been revised as suggested.
149.	2212	82	11.3.1		ERM believes that the EPA's questions regarding the modified Method 680/8270D-SIMS can be addressed so that this method can be approved for use in Phase 1A. However given that DMA data collected from several PRIs confirm that PCBs will not be screened out during Phase 1A, there is no reason to collect additional PCB data from these areas for the purpose of COPC selection. Additional	Revise the text to exclude PCB analysis of samples collected in PRIs 1, 4, 5, 6, and 7 where definitive data that show elevated levels of PCBs.	At the time the draft SAP was written, ERM had not provided the EPA with sufficient information to assess Modified Method 680, nor provided a plan for testing its performance at the Site. Since then, the information requested by the EPA has been provided, and the EPA has sent a letter to ERM dated 10 July 2013, outlining a proposed plan for testing Modified

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					DMA work may be conducted, as suggested, to demonstrate the method's site-specific performance under the condition that additional PCB data collection from PRIs known to have high levels of PCBs is deferred to later phases of the RI.		Method 680. If the performance can be verified to meet the Phase 1A DQOs, ERM may request a modification or amendment to the Phase 1A SAP to describe the use of Modified Method 680.
150.	2212 - 2221	82	11.3.1	NA	The SAP states: "Identifying the specific type and mass of PCB congeners is difficult to resolve without use of more costly, high-resolution mass spectrometry analytical techniques. . SAP depends on USEPA Method 1668 for all PCB analyses . . [use of other] methodology . . would require method verification in the complex media at the Site …the opportunity may exist for less-costly congener-specific analyses to be employed during later project phases." HRGC/HRMS Method 1668 cannot accommodate high concentration PCB samples at the Site, and data quality will likely be compromised. Method 680/8270D-SIMS (a modification of USEPA Method 8270D-SIM) performed by Alpha Analytical in Mansfield, MA, is an appropriate method for high concentration PCB samples. ERM believes method verification of this alternate PCB method could be conducted prior to Phase 1A sample analysis, refer to Technical Memorandum (12 June 2012). Although as stated in the previous comments we do not believe that additional PCB data collection is necessary in several PRIs with known	Identifying the specific type and mass of PCB congeners is difficult <u>because of the range of sample concentrations at the Site. The more costly, high-resolution mass spectrometry analytical technique used in Method 1668 is only appropriate to conduct the COPC screen on low concentration samples, and an alternate method is necessary to address the high concentration samples. Method 680/8270D-SIMS (a modification of USEPA Method 8270D-SIM) performed by Alpha Analytical in Mansfield, MA, is an appropriate method for high concentration samples. If a sample submitted for 680/8270D-SIMS analysis is found to have concentrations at or below the Method 680/8270D-SIMS MDLs, the sample will be submitted for analysis by Method 1668 if necessary to complete COPC selection.</u>	See response to comment 149.

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					high concentrations, Method 680/8270D-SIMS is the appropriate method for analyzing any high concentration samples collected during Phase 1A. If a sample submitted for 680/8270D-SIMS analysis is found to have concentrations at or below the Method 680/8270D-SIMS MDLs, the sample could be submitted for analysis by Method 1668.		
151.	2226-2230	82	11.3.1		The discussion of fine grain particulates presented here is related to exposure and not COPC selection. If this concern may be shown to be a relevant factor, a DQO can be developed and data collected during a later phase of the RI. ERM believes that including this evaluation at this stage of the RI is costly and unnecessary. If these data are determined to be important in the future they can be collected for COPCs of interest and from exposure areas determined to represent a potentially complete pathway for "hand to mouth" exposures, thereby eliminating non COPC analysis and reducing cost.	Omit all references to evaluating bulk versus fine soil/sediment/waste from the Phase 1A SAP.	An evaluation of concentration as a function of particle size is required to ensure that the data collected for COPC selection are robust. More specifically, if an analyte is excluded as a COPC because Cmax for coarse material does not exceed the RBC, but the Cmax for fine grained material does exceed the RBC, this would result in a Type I error (incorrect exclusion of the COPC for further consideration). The text has been revised to provide clearer justification for the need for this evaluation.
152.	2231-2236	82	11.3.1		It is well-understood and accepted in environmental sampling of solid media that contaminant concentration may be higher in fine-grained particles. This factor was fully evaluated during the DMA as it relates to reproducibility, and was clearly shown to not be of concern for the Phase 1A data collection. Therefor the only rationale to collect these data is for exposure concentration determination,	Omit all references to evaluating bulk versus fine soil/sediment/waste from the Phase 1A SAP.	The DMA did not evaluate the potential differences between bulk and fine-grained materials. Simple testing of precision of bulk samples is not equivalent to the testing needed. As noted above, exposure concentration IS an essential part of COPC selection.

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					which is not relevant to the Phase 1A DQO.		
153.	2250-2264	83-84	WS11	Including Figure 11-1	The investigation described in this section first appears in DQO Step 7. This labor intensive and costly exercise does not appear to be related to or support COPC selection, the objective of the Phase 1A RI. Furthermore, ERM has serious concerns about the implementability of this exercise; considering the amount of soil sample necessary to obtain the required sample volume would require sieving an excessive amount of material through a 0.25 mm screen. Sieving through such a fine screen was not evaluated during the Phase 1A Soil/Sediment/Waste/Water DMA.	Omit all references to evaluating bulk versus fine soil/sediment/waste from the Phase 1A SAP.	The DQOs have been revised to add additional explanation of the need for this type of data as part of the COPC selection process. Based on a suggestion from ERM, and as discussed in a call between the EPA and ERM on 13 Aug 2013, EPA has modified the protocol for determining where such sieved samples are needed.
154.	2274 - 2285	84-85	11.3.1		Please provide a technical rationale or a reference to guidance that supports the proposed methodology of using a regression analysis to evaluate the bulk versus fine results. There is no discussion of how the regression analysis will be interpreted. There is a discussion of potential "adjustment," but details as to how and when this would be used are not presented.	Provide reference for evaluating bulk versus fine soil/sediment/waste a regression analysis or remove from the Phase 1A SAP.	The object of the investigation is to establish the average relation between two measurements. Regression analysis is a simple and effective standard statistical technique that allows for a quantitative relation to be established as well as providing a useful visual presentation of all the data. Other methods (e.g., calculating the ratio of each pair and then averaging) often tend to over-emphasize the pairs at low concentration and under-value the pairs at high concentration. The EPA has used regression analysis of coarse vs fine samples at numerous other sites where the effect of sieving has been investigated.

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155.	2286-2297	85	11.3.1		The criteria proposed here (>80% of the samples have >75% fine grained material; the difference between fine and bulk is <20%) are unsubstantiated. What is the basis for selecting these criteria? How do they relate to the regression analysis proposed in the preceding paragraph? How does any of this relate to COPC selection?	Omit all references to evaluating bulk versus fine soil/sediment/waste from the Phase 1A SAP.	The text already explains that these criteria are judgment based and derived simply by calculating the maximum difference that could occur if these criteria were met. The point is that if a medium has nearly all fine grained material, or if the difference between fine-grained and coarse if small (within the usually bounds of analytical variability), then further efforts are likely not needed.
156.	2309	85	11.3.2		Rewording suggested	"~~Very little~~ Limited historical surface water and wastewater data have been collected at the Site."	The text has been revised as suggested.
157.	2309	85	11.3.2		The statement that only three surface water samples had been analyzed historically is incorrect and should be revised to reflect the accurate number of historical surface water samples. Note that six "surface water" samples are depicted in Figure 10-8. The database includes data associated with approximately 20 samples collected prior to the DMA. Additional surface water samples were collected during the DMA.	The text needs to be revised accordingly.	The text has been revised to more generally discuss historical surface water sampling.
158.	2312	85	11.3.2		The statement that no samples were historically collected from the ditches is incorrect. The database includes data associated with several samples of water collected from the ditches prior to the DMA (for example, see the USEPA ERT sampling events). An additional ditch water sample was collected during the DMA.	The text needs to be revised accordingly.	The text has been revised to more generally discuss historical surface water sampling.
159.	2315	85	11.3.2		This sentence does not appear to be factual.	The text needs to be revised to	The text has been revised to more

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					This feature may be a water supply ditch that brought fresh water from Skull Valley, not a wastewater discharge ditch as described.	better describe the feature being referred to.	generally discuss historical surface water sampling.
160.	2325	86	11.3.2		The term "low" in the introductory statement ("The overall density of groundwater wells and piezometers across the Site is low.") is subjective, and should be revised to reflect specific issues with respect to the Phase 1A investigation objectives.		The text has been revised indicate that the density of existing wells is too limited to support a reliable evaluation of water quality in locations that are downgradient from potential source areas.
161.	2325	86	11.3.2		Rewording suggested	"~~Many~~ Certain monitoring points may not be screened at an appropriate range of depths…"	The text has been revised as suggested.
162.	2350	86	11.3.2		We question the statement "For groundwater, the primary discharge sources of Site contamination to groundwater appear to be the waste conveyance ditches, the landfill, and the ponded waste lagoons (MWH 2005)." Please provide the correct citation and the location within it where the stated conclusion is presented - there are three documents listed in the References that were prepared by MWH in 2005. In particular, the assertion that the landfill is a "primary discharge source of Site contamination" to groundwater is unsubstantiated and should be deleted. If the overall conclusion regarding the "primary" discharge sources" is a USEPA conclusion and is not presented in an MWH report, the citation should be removed.	The text needs to be revised accordingly.	The references and citations have been corrected. The description of source areas to groundwater is intended to be general. The text has been revised as follows: "Potential sources of Site contamination to groundwater may include the waste conveyance ditches, the landfill, the ponded waste lagoons, the Gypsum Pile and the facility."

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163.	2355	86	11.3.2		It is unclear from the 1998 aerial photo referenced which "historical conveyance" is being referenced, and how it could be serving as a "preferential pathway for groundwater migration." Is this reference to the historical temporary diversion ditch temporarily used to convey wastewater after the old waste pond was inundated in 1986?	Suggest adding a figure and text to clearly identify and describe this feature. This information should then be used to support the sample design presented in Step 7 of the DQO process for PRI-2, PRI-14, and PRI 17.	The aerial photograph in Attachment 10A has been revised to more clearly show the former diversion ditch referenced in Section 11.3.2.
164.	2359	86	11.3.2		Suggested rewording for statement: "As described in WS10, very little surface water information is available for the Site…"	"As described in WS10, ~~very little~~ limited surface water information is available for the Site…"	The text has been revised as suggested.
165.	2361	86	11.3.2		The last sentence starting on this page presents an inaccurate time frame. Suggest rewording that and the subsequent sentence on the following page.	"~~In the absence of data, surface water sampling is expected to occur in the fall of 2012.~~ If ~~subsequent~~ investigations subsequent to the Phase 1A surface water sampling (anticipated for Summer/Fall 2013) suggest that surface water concentration values measured ~~in this time frame~~ during the Phase 1A sampling event may underestimate the highest values that may occur, then additional data from other times of year may be required to support COPC selection."	The text has been revised to indicate substantial seasonal variations in surface water concentrations are not expected, but that some data on seasonal variation may be collected during Phase 1B.
166.	2364	87	11.3.2		The SAP should provide the criteria for deciding if subsequent sampling is required for COPC selection.	The text needs to be revised accordingly.	See response to comment 165.
167.	2372	87	13.3.2		Please revise Step 5 into an "if…then" statement.		See response to comment 134.

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168.	2382	87	11.3.2		The sentence starting on this line is misleading, as site-wide surface and groundwater comprise PRI-17. Suggest rewording to correct that misrepresentation, and to allow for variation on COPCs as appropriate.	"For surface water and groundwater, because these flow across the land-based PRI boundaries ~~from area to area~~ and interact with each other, COPC selection will ~~not~~ be ~~on a PRI basis as is the case with soil/sediment/solid waste, but~~ on a Site-wide basis. Exceptions may be allowed for a given COPC if it is clearly limited in extent and demonstrated to be absent from cross- or up gradient areas of the Site (from which areas it may be eliminated as a COPC).	For the reasons stated in the text, during Phase 1A, a single list of COPCs will be developed for site-wide water. However, as data become available, it may be possible to narrow the list of COPCs for water in some PRIs or subareas.
169.	2387	87	13.3.2		The logic presented for the selection of 30 surface water and 30 groundwater samples to ensure that Cmax exceeds the true mean is unsound. Based on this DQO, the 30 samples should be placed randomly across the site. However, random placement is not proposed. Instead the proposed sample design appears to target source areas, thus potentially biasing high the concentrations, and reducing sample variability. Therefore, for these media, defining a sample size based on the skewness of the underlying distribution is not the preferred means of developing a statistically-based sample design for surface water and groundwater.		See response to comment 170.
170.	2414	88	11.3.2		The concluding sentence ("On this basis, a set of up to 30 samples of surface water and 30 samples of groundwater may be required.") is unsubstantiated, and has not	Suggest that the sentence be modified to reflect that professional judgment is used to identify the number and location	The existing text is clear that the assumption that the true mean might occupy the 90th percentile is based on professional judgment. The statistical

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					been discussed in scoping meeting discussions. Furthermore, the proposed scope of work is inconsistent with this required sample set size, in that far fewer than 30 groundwater samples are proposed, and more than 30 surface water samples are proposed.	of samples for the surface water and groundwater investigation.	basis for the need for up to 30 samples based on this assumption is provided in Section 11.3.1. The text has not been revised in response to this comment.
171.	2431	88	WS11		The description should be revised as suggested.	Ditches all have differing sources <u>except the Main Ditch, which receives wastewater from the other three ditches.</u>	The text has been revised as suggested.
172.	2433	88	WS11		The phrase "with the slurry liquid sourced from process streams within the plant" should be deleted. There is a single source for the gypsum slurry.		The text has been revised as suggested.
173.	2436	88	WS11		The description should be revised as suggested.	Receives process waste<u>water from the Main Ditch</u> and may be…	The text has been revised as suggested.
174.	2438	88	WS11		The description should be revised as suggested.	Receives <u>process wastewater from the southeast ponded waste lagoon (PRI 5)</u> and waste slurry…	The text has been revised as suggested.
175.	2440-2443	88	WS11		The description should be revised as suggested.	...received early-era production wastewater, and was subsequently inundated by GSL, and has a number of in-flow seeps emanating from up gradient sources ~~that appear to include the "active" waste lagoons~~ (Attachment 10B)….	The text has been revised as suggested.
176.	2444	89	WS11		The description should be revised as suggested.	... seeps that ~~appear~~ <u>may to originate from PRI</u> ~~6~~ <u>5</u> and 7, or from…	The text has been revised as suggested.
177.	2445	89	11.3.2		See prior comment for line 2355 re:		The text has been revised as suggested.

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					preferential pathway, and revise wording here as appropriate.		
178.	2450-2452	89	WS11		The SAP must clearly describe how to select alternate sample locations if no surface water is present (in quantity suitable for sampling) within either 100 feet or 500 feet of the target. As written, sample locations may be relocated to within 100 feet, but USEPA must be contacted to determine action if water is not within 500 feet. ERM proposes that water sample locations may be relocated to within 500 feet; however, no water sample should be collected if water is not present within 500 feet of USEPA's proposed locations.	The text needs to be revised accordingly.	See response to comment 10.
179.	2454-2456	89	WS11		The SAP should identify how surface water level measurements are relevant to the Phase 1A water DQO of COPC selection. The rationale for surface water level measurement should be discussed prior to Step 7 in the DQOs. The monthly collection of water levels is not indicated in the project schedule (WS 16).	Provide technical rationale for surface water level, or omit from the Phase 1A SAP.	Water level information is important for refining the CSM to better understand the interaction of surface water and groundwater at the Site. Worksheet #11 has been revised accordingly. Worksheet #16 has not been revised to show this level of detail.
180.	2462	89	WS11		The SAP should specify whether split samples will be collected by USEPA and whether the use of a splitter will be required.	The text needs to be revised accordingly.	The text has been revised to clarify that a splitter is required to provide split samples of water.
181.	2465	89	11.3.2	NA	WS15 is referenced for the list of analytical methods, but the reference should be to WS18, which in turn references WS15.	Revise as noted in comment.	Worksheet #15 is organized by medium and by analytical method. The text has not been revised in response to this comment.
182.	2468	89	11.3.2		The sentence starting on this line lists two	The sentence is misleading and	The text has been modified to include

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					potential sources of groundwater impacts. These are not the only potential sources of groundwater impacts; for example, groundwater impacts could arise from migration of contaminants from off-site sources.	unnecessary, and should be deleted.	migration of contaminants from off-site sources as a potential source of groundwater impact.
183.	2471	89	11.3.2		The tally of wells specified in this line (17 existing wells and 6 new wells) is not consistent with what is shown in Figure 14-13 (18 existing wells, 6 new wells, and 2 additional new nested wells). Furthermore, the tally is not consistent with WS18, which specifies 18 existing wells, 7 new wells, and two nested wells.	The references to wells included in the monitoring program needs to be revised for consistency throughout the SAP.	The text has been revised to ensure consistency in well tallies.
184.	2475	89	11.3.2		Proposed re-wording	"...the placement and design of new proposed wells is the presence of <u>an apparent</u> groundwater mound…"	The text has been revised as suggested.
185.	2483	89	13.3.2		The evaluation of the downward vertical gradient does not appear to be relevant to the Phase 1A DQO of COPC selection.	Provide technical rationale for the collection of these data or omit from the Phase 1A SAP.	The text has been revised to explain why collection of water samples to assess vertical gradient is important.
186.	2524	90	11.3.3		Duration of air sample collection is stated as 3 - 7 days. The intended matrix will accommodate up to 6-day samples	Replace "3 - 7 days" with "3 - 6 days" in the parenthetical example.	The text has been revised as suggested.
187.	2547	91	13.3.3		Please revise Step 5 into an "if…then" statement(s).		See response to comment 134.
188.	2600	92	11.3.3		Duration of air sample collection is stated as 3 - 7 days. The intended matrix will accommodate up to 6-day samples	Replace "3 - 7 days" with "3 - 6 days" in the parenthetical example.	The text has been revised as suggested.
189.	2600	92	11.3.3		The statement on these lines related to chronic toxicants that "observed Cmax value in a dataset . . Will exceed the *highest* true long-term average	Provide the rationale for using the highest single-location Cbar value as the basis for comparison of test-period predicted Cbar-max to	The text already explains why the single highest concentration anywhere on site ("Cbarmax") is the appropriate basis for use in calculation of

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					concentration *anywhere on the site* (lines 2600-01) " is inconsistent with the concepts two paragraphs above (lines 2582 - 2589) that indicate that Cmax is compared to the true long term mean within the exposure area. The criteria set in the latter bullet point is a much higher bar for acceptance of the air Phase 1A data.	the data from the Phase 1A dataset. From the outset, the understanding has been that the threshold was that the highest sample had a high confidence of exceeding *the mean of the exposure area concentrations*, not that it would exceed that highest *single-location average* concentration.	probability values for each receptor location, rather than the site-wide mean. However, the text has been revised to further clarify why this is the correct approach.
190.	2638	93	11.3.3		The parenthetical "(tons per day)" is not needed in this context. Also, the statement "there is no significant doubt that both of these analytes are released from plant operations in sufficient quantities (tons per day) to warrant quantitative evaluation for both acute and chronic exposures" draws conclusions where the purpose of this SAP is to identify COPCs. US Magnesium has agreed to include Chlorine and HCl as COCs to be evaluated in the baseline risk assessment.	~~Even though~~ Available data on Cl2 and HCl in air are not sufficient to derive reliable quantitative estimates of short-term or long-term average exposure levels.~~, there is no significant doubt that both of these analytes are released from plant operations in sufficient quantities (tons per day) to warrant quantitative evaluation.~~	The text as written is needed to provide the rationale for why the EPA and ERM have both concluded that Cl_2 and HCl may be identified as COPCs in air even before any new data are collected, and why neither of these 2 analytes is included in the Phase 1A design.
191.	2790	98	11.3.3	Figure 14-15	Of the five sample station locations shown on this figure, two shown in the Lakeside Mountains (Stations 2 and 3) are not practically feasible due to private land ownership, and/or lack of minimally safe access during adverse winter conditions. One of the close-in stations (Station 5) is placed alongside an active plant road, which would likely lead to contamination of the samples.	ERM will provide alternative station selections that have comparable ranking for high - biased concentrations, but have better assurance of safe access based on site survey on 22 May 2012. Based on USEPA and ERM modeling results, there are sites that have comparable ranking with respect to Cbar-max exceedances but more favorable site access. This paragraph should	The text already states that accessibility is an important factor in selection of sampling locations. The EPA will coordinate with ERM to visit the proposed sites and the EPA will consider ERM recommendations for relocation of some stations to address accessibility concerns and to minimize impacts from road traffic. As discussed below (see response to comment 193), new AERMOD

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						also include the option of splitting the Phase 1A air sampling into two periods, one in January 2014 at the "close in" sampling locations, followed by a period in November 2014 during more favorable conditions at the Lakeside Mountain sites locations.	calculations performed by the EPA indicate that sampling in the Lakeside Mountains in winter is not optimum, so the final SAP no longer calls for sampling in the winter. Hence, the need to split Phase 1A into two periods is now moot.
192.	2819	99	11.3.3		This section outlines the quantitative ranking evaluation to be carried out post-sampling to assess whether the sample set would be expected to have Cmax above the single-location highest three-year average predicted by USEPA 250-meter grid AERMOD results (2009-2011). Because different analytes will have different levels of non-detects, and due to uncertainties in the modeling assessment, this section should also include the additional "lines of evidence" approaches described in ERM's Phase 1A Proposals #3 included as Attachment A of the USEPA-approved Summary of Phase 1A Scoping Discussions.	Include supporting lines of evidence approaches that would evaluate the wind rose characteristics, the relative coincident concentrations among different analytes. Rewrite this paragraph to recognize that such methods are conventionally used in ambient air quality studies to explain the observed concentrations and/or anomalies. The alternative lines-of-evidence approach is also applicable to the assessment of non-detected analytes that (due to analytical limitations) may exceed the RBC in some or all samples.	The "alternative lines of evidence" that have been recommended for insertion are based primarily on concerns that were raised regarding an earlier protocol that the EPA developed for use in data adequacy assessment. The EPA agrees that the earlier protocol would have been problematic, especially in cases where an analyte was rarely or never detected. However, the current data adequacy assessment protocol does not depend on a comparison of expected vs observed detection frequency or skewness, but rather is based mainly on a consideration of wind patterns during the sampling event and the relative concentrations predicted by AERMOD (both of which were identified as factors for consideration in the "alternative lines of evidence" approach). Thus, Step 2 of the current protocol already captures and utilizes the same concepts being recommended. Note, however, that

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							even if wind patterns during Phase 1A are expected to produce an adequate data set, a conclusion the data are adequate is still contingent on the analyte-specific detection limits being equal to or lower than the risk-based concentrations (Step 3 of the protocol).
193.	2831	99	11.3.3		The derivation of Cbar-max used by USEPA to rank the 250 m grid receptor nodes is not sufficiently transparent in the SAP narrative or figures. Review of the USEPA modeling results that identify the location and value for Cbar-max shows significant discrepancies with prior ERM modeling. In ERM modeling that used 3 full years of on-site data, we find Cbar-max at a receptor immediately south of the plant, and at one of the highest-ranked predicted concentration points for January based on 2010, 2011 and 2012 data. In the USEPA modeling the Cbar-max is at a comparable location a few hundred meters northwest, but contrary to ERM results the 3-year average Cbar-max receptor is at one of the lowest-ranked locations for January concentrations. Based on this latter result, if ERM placed a sampler in January at the USEPA's Cbar-max location, then for that month USEPA's own model would predict a relatively low chance of obtaining a sample above Cbar-max. The Cbar-max is a critical parameter for use in validating Phase 1A samples and for sampling event modeled simulations during Phase 1A.	The SAP discussion regarding the method for post-sampling evaluation for capture of high-biased samples must make clear that ERM-developed modeling tools will be used for evaluating the adequacy of Phase 1A air monitoring data. Comparative reviews of the AERMOD simulation results derived by ERM and USEPA show some discrepancies in the Cbar-max derivation and other differences in the spatial distribution of the receptor rankings compared to Cbar-max. In one key example, ERM modeling indicates that Cbar-max for the full 3-year data set occurs at a receptor point immediately south of the plant, and that this receptor is among the highest-ranked predicted concentration points for January. In contrast, while the USEPA-modeled Cbar-max location is spatially close to that predicted by ERM, this receptor and those	The draft SAP included a full set of input and output files for all of the EPA's AERMOD calculations. The EPA will provide any additional files or information that may be requested to clarify or document the EPA's approach. Based on a conference call between ERM and the EPA on 31 Jun 2103, it was clarified that the differences mentioned in the comment are not a result of errors in the EPA's calculations, but to differences in approach. More specifically, the EPA's decision to stratify the calculations by source (stack, fugitive) results in different sampling locations than were determined by ERM using an approach where both sources are modeled together. In addition, the statistical ranking strategy used by the EPA is not expected to yield the same result as the statistical strategy followed by ERM. The draft SAP described the EPA's reasons for following the "split source" approach and the basis for the statistical data ranking strategy.

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					Additional details regarding the USEPA methodology and derivation of receptor ranking results are needed in the SAP to better define the process for evaluating the adequacy of Phase 1A air monitoring data.	around it are among the lowest-ranked receptors for January concentrations. Clearly, the two sets of AERMOD operating files are not interchangeable. Also, it is not clear whether USEPA's use of separate modeling runs to track the impacts of fugitive and stack emissions might not give misleading results for Cbar-max and the receptor rankings. It is expected that overlapping influences from both fugitive and stack categories will influence the actual distribution of concentrations that is being simulated, especially near the plant. Given these factors, it is essential that ERM's AERMOD simulation structure be used in future studies, in light of the counter-intuitive results from the USEPA model. Furthermore, ERM is are unfamiliar with and will likely not concur with the USEPA derivation of their input structure. The text of the SAP in this section needs should be revised to clearly state that ERM modelers will calculate the Cbar-max used for evaluating the adequacy of Phase 1A air monitoring data.	However, as a follow up to the ERM comments, the EPA performed additional AERMOD calculations to investigate the optimal times and locations for Phase 1A sampling. These calculations did not assume that winter was the optimal time for sampling, but rather estimated the probability of a random sample at each station exceeding Cbarmax as a function of sampling time (using rolling 3-month time-windows) and source (stack vs fugitive). These results were promptly shared with ERM and discussed in a conference call on 12 Aug 2013. Based on the new calculations, consensus was reached that the optimum time for sampling is in summer (not winter), and that this shifted the optimum locations of sampling stations to an area south and west of the stack. This change has been incorporated into the revised SAP. In accord with the AOC, the EPA agrees that it is ERM's responsibility to perform the AERMOD calculations to evaluate Phase 1A data adequacy. However, these calculations must be performed using the approach specified by the EPA, not any prior "ERM-developed modeling tools" or "simulation structure." Moreover, the EPA may choose to independently

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							check ERM calculations, as deemed necessary.
194.	2829	99	11.3.3		Temperature measurements are not taken of the gas exiting the stack. Stack gas temperatures are obtained during annual stack testing, and some gas temperature measurements are taken in the off-gas train at various locations, primarily at the scrubber outlets.	Omit all references to the use of stack gas temperatures from the Phase 1A SAP.	The text has been revised to omit a requirement to monitor stack temperatures during the Phase 1A monitoring period(s).
195.	2890-2893	100	11.3.3		PM10 is missing from the list of potential chronic toxicants		The text has been revised as suggested.
196.	2900	101	11.3.3	Table 11-2	PM10 is missing from Table 11-2.		The table has been revised as suggested.
197.	2908-2913	101	11.3.3		This bullet modifies the co-located duplicate collection method to use a sixth, "mobile air monitoring station," that "will be moved to collect duplicate samples at various locations and times." This approach disregards the physical requirements for competent ambient air sampling using the proposed methods, under expected adverse weather and road conditions, and in remote locales. The physical installation of the samplers requires a stable, stationary platform, adequate 110 v power, and involves significant labor to locate the equipment. There is no substantive statistical benefit to offset the significant cost and labor of "randomizing" the selection of the equipment for the precision assessment. This approach is not included in even the most-stringent USEPA-approved programs for air quality monitoring and compliance	This bullet should be revised as follows to reflect that the purpose of co-located duplicates is to assess method precision. <u>A single location will be used for the co-located duplicates to assess method precision, as per the Compendium Methods, for the relatively short Phase 1A program.</u>	The text has been revised as suggested.

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					programs and is not appropriate for this study.		
198.	2951	102	13.3.4		Please revise Step 5 into an "if…then" statement(s).		See response to comment 134.
199.	3109	106	11.3.6		The sentence incorrectly references WS9 for details regarding the DMA sample collection, analyses, and assessment, and should be revised to cite the correct reference (Attachment 11E would be appropriate)	Revise as indicated.	The text has been revised to refer to Attachments 11E and 11F.
200.	3119	106	11.3.6	NA	Cr (VI) analyses should be retained for aqueous matrices. ERM has proposed Method 7199-modified, based in part on the recommendation made by USEPA in their 25 May 2013 Post-DMA Analytical Methods Memorandum. Cr (VI) analysis for aqueous matrix samples should also be specified/described in WSs 15, 18, 19, 23, 24, 25, 28, and 30. See comment on line 4210, Table 23-1 for details.	Delete sentence: "Chromium VI analyses were dropped from the target analyte list for Phase 1A."	The text has been revised as suggested.
201.	3198	112	WS12	Table 12-1	RPD criteria are required for the evaluation of precision by MS/MSD for soil matrix. The laboratory will analyze LCS samples to verify accuracy. LCSD samples (to assess precision) are not analyzed. Precision is evaluated by MS/MSD and lab duplicates.	The text needs to be revised accordingly.	MS/MSD samples are used to evaluate both precision and accuracy in Site media. An RPD criterion of ≤ 50% has been added.
202.	3198	112	WS 12	12-1	Field duplicate frequency can be reduced. DMA data demonstrated that there is good agreement between sample duplicates.	Change field duplicate frequency to 5% with footnote (e): Field duplicate samples will be collected at a frequency of 1 per PRI. At least one duplicate sample of each site matrix will be	Collection of 10% field duplicates is standard EPA protocol. The text has not been revised in response to this comment.

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						collected.	
203.	3198	112	WS 12	12-1	Rinsate blank frequency as described in footnote (a) can be reduced.	Change the first sentence of footnote (a) to "Equipment rinsate samples will be collected at a frequency of one per week per type of non-dedicated sample collection equipment used."	The text has been revised as suggested.
204.	3198	112	WS 12	12-1	Trip blanks are called out for Solid/Sediment/ Solid Waste samples and for Groundwater/ Surface Water/Wastewater samples. Footnote (c) is applied only to the water table, and the footnote states (in part): "One trip blank will accompany each sample transport container that holds water samples for analysis of VOCs back to the laboratory." This footnote should also apply to solid matrix samples.	"One trip blank will accompany each sample transport container that holds solid and/or water samples for analysis of VOCs back to the laboratory." This footnote should also apply to solid matrix samples.	The text has been revised as suggested.
205.	3198	112	WS 12	12-1	MPC for blanks is: "No target compounds > PQL." National Functional Guidelines for Superfund Organic Methods Data Review states: "The concentration of each target compound found in the storage, method, field, or trip blanks must be less than its CRQL listed in the method, except for methylene chloride, acetone, and 2-butanone which must be less than 2 times (2x) their respective CRQLs" and "The concentration of bis(2-ethylhexyl)phthalate found in the method blank must be less than five times (5x) its respective CRQL listed in the method."	Change MPC for all blanks to: "No target compounds > PQL, except for methylene chloride, acetone, and 2-butanone, which must be less than 2 times (2x) their respective PQL and bis(2-ethylhexyl)phthalate, which must be less than five times (5x) its PQL."	The text has been revised as suggested.
206.	3198	114	WS12	Table 12-1	LCSD samples (to assess precision) are not analyzed. Precision is evaluated by	The text needs to be revised accordingly.	The text has bee revised as suggested.

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					MS/MSD and lab duplicates. The frequency for Method Blanks is one per laboratory batch, not 5%.		
207.	3219	115	WS12	Table 12-2	The need for backup PUF media is being evaluated during the Air DMA; it is therefore premature to require backup media in the SAP.	At a minimum, Table 12-2 should include a footnote indicating that the use of backup media is being evaluated during the Air DMA.	A footnote has been added to the table explaining that decisions about analytical methods and QC requirements for air samples may be revised based on the results of the DMA.
208.	3219	115-118	12	Table 12-2 (WS12)	Entries for "Field Duplicates" for each of the Phase 1A methods now read: "1 per 10 field sample set." The key feature of the field duplicates for air sampling precision analysis is that co-located sampler operation will provide the duplicates not less frequently than once per week, at one location. If the final sample duration for the chronic toxicants is 3-days, then 10 samples would be collected per week (5 locations x 2 per week), along with one complete set of co-located duplicates.	For Field Duplicate entries in each sub-section of Table 12-2 for Ambient Air the minimum Frequency should be changed to: "One co-located duplicate sample, not less frequently than once per week, or 1 in 10 site-wide sample sets"	The text has been revised as suggested.
209.	3219	118	WS12	Table 12-2	The need for backup sorbent tubes is being evaluated during the Air DMA; it is therefore premature to require backup media in the SAP.	At a minimum, Table 12-2 should include a footnote indicating that the use of backup media is being evaluated during the Air DMA.	See response to comment 207.
210.	3265	121	WS13		Secondary data are relied upon heavily in the SAP and should be identified in WS13. Examples of historical data relied upon in the SAP include historical sampling results which are discussed extensively in WS10 and used as the basis for sampling design in WS11, meteorological data that are used for modeling air transport and selecting Phase 1A air monitoring locations, data	The text and table on line 3266 need to be revised to include the list of secondary data used during the preparation of this SAP.	Worksheet #13 has been revised as suggested.

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					from the October 2012 DMA which were used to refine the Phase 1A analytical program, historical water level measurements which were used to infer groundwater flow directions when designing the investigation for PRI17, and stack and ambient air monitoring data that provide the basis for air investigations (see DQO Step 1).		
211.	3313	123	WS14, Sect 14.2.1		The references to WS9 and 11 are incorrect, as these worksheets do not summarize method modifications or changes to the analytical program indicated by the DMA.	The text needs to be revised accordingly.	The text has been revised as suggested.
212.	3349	124	WS14, Sect 14.3		There is no list of PRI groupings. The SAP should include a list of PRI groupings and indicate how PRI groupings will be used for evaluation of COPC selection.		The text has been revised as suggested.
213.	3357	125	WS14, Sect 14.3		This sentence (beginning with "Based on the soil/sediment/solid waste/water DMA…") does not make sense and is not necessary.	Omit lines 3357 to 3359	The text has been revised appropriately.
214.	3359	125	WS14, Sect 14.3		Delete reference to HCB-ICs in WS 15. The focused HCB-IC analytical method is not included with Phase 1A, but may be used during Phase 1B (see lines 2209 - 2211). No list of chemicals is provided in WS 11.	These samples will be analyzed for a comprehensive list of chemicals ~~and/or HCB-ICs~~ as described ~~previously~~ in WS ~~#11 and~~ 15.	The text has been revised as suggested.
215.	3368	125	WS14, Sect 14.3.1		There is no list of PRI groupings. The SAP should include a list of PRI groupings and indicate how PRI groupings will be used for evaluation of COPC selection.		See response to comment 212.
216.	3374	125	14.3.1		As commented previously, there is no one	The SAP needs to include a	Worksheet #14 (Section 14.3.1)

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					place where a specific detail on the sampling design for each PRI is provided (see comment on line 2176). There are just cross references to other WS (e.g., WS11 or WS18) which result in circular references.	complete description of the sample design for each PRI; suggest including at step 7 of the DQO.	already describes the basis for the placement of the 14 non-biased samples. Worksheet #14 has been revised to document the rationale for the placement of any additional biased samples.
217.	3374-3376	125	WS14, Sect 14.3.1		These lines indicate that sample design, including the number of samples, was based on the objectives and statistical evaluations presented in WS 11. However, WS 11 does not identify on a PRI basis which PRIs require "biased" samples, which samples are "biased," or how the number of "biased" samples was selected.	Include the rationale for bias sample locations in each PRI in the description of the sample design, suggest including at step 7 of the DQO.	See response to comment 216.
218.	3378	125	WS14, Sect 14.3.1		The text should be revised as suggested. The phrase "small group of samples" is subjective and not relevant to the discussion.	~~A small group of surface soil/sediment/solid waste samples~~ Generally 14 samples, will be collected in each PRI area…	The text has been revised as suggested.
219.	3379	125	WS14, Sect 14.3.1		The text should be revised to indicate how the "select" grid nodes were identified for sampling, and how this is consistent with the "systematic grid strategy" for sampling.	The text needs to be revised accordingly.	The text has been revised to clarify how the grid system was established.
220.	3386-3387	125	WS14, Sect 14.3.1		As commented earlier, ERM opposes collection of any subsurface samples unless they are shown to be necessary to achieve the Phase 1A DQO of COPC selection, or were agreed to during scoping meetings (i.e., two locations in ditches, three locations in landfill). There was no discussion of subsurface samples during the scoping meetings in many of the PRIs where subsurface sampling is proposed.	Provide detailed technical rationale for subsurface sampling in each PRI where included, or omit these samples from the Phase 1A SAP.	As noted previously, Worksheet #11 has been modified to provide additional explanation of why soil boring as needed to support COPC selection. In addition, Table 14-1 has been modified to provide rationale for subsurface soil borings.
221.	3388	125	WS14		Sample locations shown in Figures 14-1	Figures 14-1 and 14-2 need to be	All target samples have been assigned

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			, Sect 14.3.1		through 14-2 are not labeled. Sample locations require identifiers to allow for discussion of locations and to ensure samples are properly labeled.	revised accordingly.	labels.
222.	3388-3389	125	WS14, Sect 14.3.1		The SAP does not identify procedures and criteria for relocating surface samples based on field conditions. For example, sample locations may be found to be located on cliffs, within standing water, or a highly disturbed area.		See response to comment 10. A procedure for handling field changes is included in Worksheet #14. Note that neither standing water nor "a highly disturbed area" is considered to be a strong justification for relocating a sample.
223.	3390-3391	125	WS14, Sect 14.3.1		As commented previously, ERM strongly objects to the proposal of sieving soil using a 0.25 mm mesh, as this exercise does not support the soil DQO of Phase 1A. See comment on line 2222.		See responses to comments 151-153.
224.	3393	126	WS14, Sect 14.3.1		Analytical methods are not described n WS 11. Text should be revised to reference WS15, 18 and 19.	Samples will be analyzed for a comprehensive list of chemicals using standard methods as described in WS15 and 19. Saturated surface soil/sediment/waste will be analyzed for VOCs, as described in WS18.	Worksheet #11 does describe analytical methods (see Table 11-2). Nevertheless, the text has been revised as suggested.
225.	3394-3396	126	WS14, Sect 14.3.1		As commented earlier, ERM opposes collection of any subsurface samples unless they are relevant to the Phase 1A DQO of COPC selection. Refer to comments below on the samples designs proposed for each PRI depicted in Figures 14-1 to 14- 14.	Provide detailed technical rationale for subsurface sampling, or omit these samples from the Phase 1A SAP.	Worksheet #11 already provides the general rationale for these samples are needed. Table 14-1 has been revised to detail the rationale.
226.	3396	126	WS14, Sect 14.3.1		The SAP does not identify how to conduct subsurface coring in locations where waste material is either less than 6 inches deep	SAP must identify how to sample in locations with waste material less than 2 feet deep. ERM	The text has been revised to clarify the protocol for collection of depth-stratified samples and how deep each

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					(which would be completely captured by a surface sample) or if waste is less than 2 feet thick (the sample interval for core samples). It is probable that waste is either absent or less than six inches thick at proposed subsurface boring locations in PRIs 5, 6, 7 and 8.	suggests to only collect a surface sample in this instance.	boring should extend.
227.	3402-3404	126	WS14, Sect 14.3.1		As commented previously, ERM strongly objects to the proposal of sieving soil using a 0.25 mm mesh, as this exercise is relevant to the Phase 1A DQO. Line 3404 indicates that sieving of subsurface solid samples may be required if stipulated by USEPA; however, the SAP does not indicate how or when this stipulation would be made. Furthermore it is not consistent with USEPA Guidance on Systematic Planning Using the Data Quality Objectives Process (USEPA/240/B-06/001, February 2006), to include data collection stipulated by the USEPA during the execution of a sampling program, without demonstrating in the SAP that they are relevant the the Phase 1A DQO.	The SAP should provide the rationale for sieving subsurface samples and how these samples are relevant to the Phase 1A DQO, or omit these samples from the Phase 1A SAP.	See responses to comments 151-153.
228.	3411	126	14.3.2		This line references the installation of six new wells - see comment on line 2471		See response to comment 183.
229.	3413	126	14.3.2		Details should be provided somewhere in the SAP regarding the construction details (for example, approximate depths) of the proposed nested wells.	The text needs to be revised accordingly.	A well construction diagram and specifications have been included on Figure 14-16.
230.	3421	126	14.3.2		The sentence "Surface water sampling will coincide with groundwater sampling events and be performed at high and low stands of	Surface water sampling will coincide with groundwater sampling events ~~and be performed~~	The text has been revised to clarify that one round or surface water sampling will take place.

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					water on the Site" is inconsistent with the description on page 86, which indicates that one sampling event may be adequate.	~~at high and low stands of water on the Site.~~	
231.	3422	126	14.3.2.		The sentence "Surface water samples and sediment samples will be collected from the Skull Creek Diversion (Figure 14-14) at the beginning of seasonal flow to evaluate influences from the Site to surface water and sediment that enter the GSL during spring runoff" may not be consistent with an assumed Summer/Fall 2013 Phase 1A sampling event (see comment on line 2361). Please delete the sentence/requirement or revise the wording for clarification that this would represent a second mobilization. If these samples are to be included in the Phase 1A program, they should be depicted on Figure 14-14. Furthermore, the spatial boundaries of the water study (see page 86, starting on line 2344), do not list Skull Creek diversion as being relevant to Phase 1A surface water sampling activities.	Omit the requirement for Skull Creek surface water sampling from the SAP, as it is not necessary for COPC selection.	The text has been revised as suggested.
232.	3427	126	14.3.2		The parentheses should also list WS18 in addition to WS15)		Worksheet #18 only identifies analytical methods and is not a comprehensive list of chemicals as stated in the text.
233.	3427	126	14.3.2		The sentence starting with "Soil/sediment/solid waste samples…" is incomplete and should be revised as appropriate or deleted from this section, since it pertains to non-aqueous samples.		The sentence has been deleted.
234.	3434-3437	127	WS14, Sect		The SAP is misleading when the Phase 1A monitoring stations are characterized as	ERM will provide alternative station selections that have	The statistical basis of the proposed sampling locations was detailed in

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			14.3.3		being "Based on a consideration of the AERMOD predictions of locations that are expected to have the highest concentrations" and "ease of access." The locations proposed by USEPA in the Lakeside Mountains are neither easily accessible, nor do they correspond to locations predicted to have the highest concentrations. Air monitoring locations should be located closer to the County Road, where they are more accessible, more representative of potential human exposure, and predicted to have higher concentrations.	comparable ranking for high - biased concentrations, but have better assurance of safe access based on site survey on 22 May 2012. Based on USEPA and ERM modeling results, there are sites that have comparable ranking with respect to Cbar-max exceedances but more favorable site access. This paragraph should also include the option of splitting the Phase 1A air sampling into two periods, one in January 2014 at the "close in" sampling locations, followed by a period in November 2014 during more favorable conditions at the Lakeside Mountain sites locations.	Worksheet #11. However, the statistical basis of the sample size has been revised for clarity and simplicity. As noted in Worksheet #11, the statistical criterion is NOT based on "high-biased concentrations", but on the highest probabilities that one or more 3-day samples collected within the specified time window will exceed the highest long term average anywhere on site (Cbarmax). Also as stated in Worksheet #11, other factors that were considered include spatial representativeness and ease of access. The EPA recommends a field trip to visit the proposed locations and if access is considered to be a problem, the EPA will consider ERM's recommendations for revised sampling locations that are more accessible while mainlining a high probability of yield one or more samples that exceed Cbarmax. As noted earlier (see response to comment 198), new AERMOD calculations performed by the EPA have lead to the conclusion that sampling in the Lakeside Mountains in winter is not needed and that all sampling may occur in summer at stations relatively near the facility.
235.	3455	127	WS14		WS 12 does not identify what field QC		The text has been revised to clarify the

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			, Sect 14.5		samples will be collected by USEPA during oversight activities, and what criteria will be used for evaluating split sample results. The UFP-QAPP Manual states: "[t]he requirements of the UFP-QAPP Manual must also be adhered to by regulatory entities collecting environmental data for oversight purposes" (Section 1.1.2) and "[w]henever split sampling and analysis are performed (e.g., multiple data generators on the same project or as part of USEPA oversight of the lead organization and its contractors and subcontractors), comparability criteria must be established and documented in the QAPP or the oversight QAPP prior to data collection" (Section 2.6.2.5.1)		EPA's Oversight Sampling QAPP for split samples will provide the criteria that will be used for evaluating split sample results.
236.	3466-3467	128	WS14, Sect 14.5.1.1		Subsurface clearance will be performed by ERM in accordance with ERM's global Subsurface Clearance requirements. The text should be revised as suggested.	All clearances needed for borehole drilling will be obtained in accordance with ERM's Subsurface Clearance (SSC) Policy, which is included as an attachment to relevant SOPs.	The text has been revised as suggested.
237.	3471	128	WS14, Sect 14.5.1.2		It is impractical, from a health and safety perspective, and unnecessary, for a certified survey to survey all Phase 1A sampling locations. The SAP should indicate that all solids and surface water sampling locations will be surveyed using GPS and that only newly installed monitoring wells will be surveyed by a licensed surveyor. The text should be revised as suggested.	Solids and surface water sampling locations will be surveyed using GPS, in accordance with the requirements of the DMP. Newly installed groundwater monitoring wells will be surveyed by a State of Utah licensed land surveyor. The horizontal and vertical position of each point will be established using known control monuments and benchmarks in	The text has been revised as suggested.

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						coordination with base personnel. The horizontal position of each well will be established to an accuracy of no less than 0.10 foot. The vertical position for the newly installed wells will be established on the polyvinyl chloride (PVC) riser to an accuracy of 0.01 foot.	
238.	3488-3499	128	WS14, Sect 14.5.3		Soil cuttings will be generated at *some* sites, not at *most* sites as the SAP indicates. IDW will also include used PPE. The procedures for managing IDW are as follow: • Used PPE will be disposed of in dumpsters at the Plant. • Decontamination water will be disposed of to the central Wastewater Ditch in the Plant. • Excess soil from surface soil sample collection will be left in-place. • Excess soil from subsurface borings and soil cuttings from monitoring well installation will be containerized in 55-gallon drums, pending characterization for disposal. • Development water and purge water from monitoring wells will be containerized in 55-gallon drums, pending characterization for disposal. The text should be revised to accurately reflect these procedures. The reference to only containerizing IDW from areas "down	The text needs to be revised accordingly.	The text has been revised as suggested.

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					gradient of a PRI area" should be deleted, as this makes no sense. The statement that IDW characterization samples will be collected should be deleted. IDW may be characterized entirely or in part based on Phase 1A sample results.		
239.	3502	129	14.6.1		States that USEPA will establish and maintain official database and document management system. This is not consistent with Section 2 of the Statement of Work included in the AOC.	Omit lines 3502 and 3503	The text has been revised as suggested.
240.	3522	129	14.6.1		The statement that "ERM will provide electronic copies of field logs, notes and other field documentation to USEPA on a daily basis during investigation activities" is not consistent with the DMP, which states that documentation will be provided on a weekly basis.	ERM will provide electronic copies of field logs, notes and other field documentation to USEPA ~~on a weekly basis during investigation activities~~ as described in the DMP.	The text has been revised to be consistent with the DMP, specifically to identify that ERM will provide the required information to the EPA on a weekly basis.
241.	3523	129	14.6.1		The statement that "ERM will also provide USEPA with electronic data deliverables of sampling data on a daily basis and continuous monitoring data on a real-time basis" is not consistent with the DMP, which states that documentation will be provided on a weekly basis.	ERM will provide USEPA with electronic data deliverables of sampling data and continuous monitoring data ~~on a daily basis and continuous monitoring data on a real-time basis~~ per the schedules outlined in the DMP.	The text has been revised to be consistent with the DMP, specifically to identify that ERM will provide the required information to the EPA on a weekly basis.
242.	3528	129	WS14, Sect 14.6.1		Lab reports and EDDs will be provided to USEPA as described in the DMP. Laboratory analytical data reports and EDDs will not be sent directly to USEPA by the laboratory.	ERM ~~shall arrange for~~ provide ~~all~~ analytical laboratory data deliverables and reports ~~to be sent directly from the laboratory~~ to USEPA ~~upon request~~ as described in the DMP.	The text has been revised to be consistent with the DMP.
243.	3558	130	WS14		Laboratory data packages will be provided	Draft full data packages (in pdf	The text has been revised to be

ATTACHMENT 4
EPA Responses to ERM Comments on May 2013 Draft Phase 1A SAP

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			, Sect 14.6.3		to USEPA as specified in the DMP. There is no guarantee that data packages will be provided "within 35 days (or earlier upon request) after the last sample in the sample delivery group (SDG) is received." Due to the extensive list of analyses required by USEPA for Phase 1A, it is highly probable that laboratory turnaround time will be greater than 35 days.	format) will be provided ~~are due~~ to USEPA as described in the DMP ~~within 35 days after the last sample in the sample delivery group (SDG) is received.~~	consistent with the DMP.
244.	3566	130	14.6.4		This sentence contradicts the current DMP and Section 2 of the Statement of Work included in the AOC. The official project database is in EQuIS 4-File format. A flat file compatible with the USEPA scribe database will be delivered at the end of each phase of data collection.	EDDs will be delivered in the format ~~compatible with the Scribe Environmental Data Delivery (EDD) format for import into USEPA's official site information~~ specified in the DMP for use with the EQuIS data management system.	The text has been revised to be consistent with the DMP.
245.	3577	131	WS14 , Sect 14.6.4		Hard copy laboratory reports will not be generated; therefore, hard copy reports will not be retained for 10 years.	Electronic ~~and hard copy~~ data must be retained for a minimum of 10 years after final data have been submitted.	The text has been revised to be consistent with the DMP.
246.	3590	131	14.7	NA	Reference for National Functional Guidelines for Inorganic Data Review is out of date; the document was updated in 2010. National Functional Guidelines for dioxins and furans (2011) should be added.	Change "(USEPA 2008, 2005b, 2004a)" to "(USEPA 2008, 2005b, 2011, 2010)"	The text has been revised as suggested.
247.	3591	130	14.6.4		Validation EDDs to be submitted to USEPA is incorrect. They should be submitted to us for update to EQuIS.	Data validators must generate and submit data validation EDD~~'~~s ~~to USEPA~~ for inclusion in the project database in accordance with the USEPA-approved Data Management Plan.	The text has been revised to be consistent with the DMP.
248.	3606	133	15.1		There has been considerable discussion	Update WS 15 as appropriate	Although a number of potentially

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					about refining TQLs based on the benchmarks used (e.g., some of the benchmarks have insufficient documentation and may be driving artificially low TQLs), and the challenges in developing TQLs for summed compounds such as PCBs and D/Fs. However, none of this discussion or potential modifications is reflected in WS15.	with revised TQLs more representative of site conditions.	useful ideas about how to improve the basis for the benchmark concentrations used to derive TQLs have been discussed between the EPA and ERM, no final decisions were ever reached. For this reason, Worksheet #15 will retain the original conservative benchmarks. The text already clearly states that these conservative benchmarks identified in Worksheet #15 may not be the same as are selected for use in the risk assessment process. Some of the benchmark values and TQLs in Worksheet #15 may be revised before or during the evaluation of Phase 1A data, as may be judged necessary and appropriate.
249.	3606	NA	WS 15	All tabs	CRQLs and comparison to TQLs should be deleted.		The tables have been revised as suggested.
250.	3606	NA	WS 15	Solid-1668 and Aqueous-1668	Decachlorobiphenyl is not listed as a homolog group	Add decachlorobiphenyl to list of analytes	The tables have been revised as suggested.
251.	3606	NA	WS 15	Aqueous-Metals	Hexavalent Chromium is included in the table and should be retained.	Analysis of hexavalent chromium by method 7199-modified should be added to the footnotes.	The table has been revised as suggested.
252.	3606	NA	WS 15	Solid-8270 and Aqueous-8270	In DMA follow-up discussions with USEPA (see 18 April 2013 e-mail from Kevin Lundmark and ERM Outcome Notes from the 4 April 2013 Phase IA Analytical Methods Chemistry/Analytical technical discussions submitted to USEPA 2 May	WS15 should be revised to included select samples analyzed for SVOCs by 8270C for follow-up analysis using the same extract in SIM mode to achieve lower QLs and DLs for some SVOCs	Worksheet #15 has been revised as suggested.

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					2013), ERM noted that SIM analysis could be conducted on selected samples analyzed for the following SVOCs by full scan 8270C-SIM confirmation: • 2,4,6-Trichlorophenol • Hexachlorobenzene (HCB) • Hexachlorobutadiene • N-nitrosodimethylamine (NDMA) • Pentachlorophenol	(HCB, PCP, and NDMA, among others). Samples with low or non-detected concentrations in selected areas of the site may be selected for SIM analysis.	
253.	3606	NA	WS 15	Solid-Other	Perchlorate analysis in solid matrices is not included in table.	Add Perchlorate analysis by Method 314.1 with follow-up analysis of detects with Method 6850. Add Industrial Soil RSL (divided by 10) as TQL: 72 mg/kg.	The table has been revised as suggested.
254.	3606	NA	WS 15	Aqueous-Other	HAA QL and DL values are incorrect.	Dibromoacetic acid QL = 0.010 mg/L, DL = 0.0038 mg/L. Dichloroacetic acid QL = 0.010 mg/L, DL = 0.0098 mg/L. Monobromoacetic acid QL = 0.010 mg/L, DL = 0.0075 mg/L. Monochloroacetic acid QL = 0.020 mg/L, DL = 0.004 mg/L. Trichloroacetic acid = 0.010 mg/L, DL = 0.0038 mg/L.	The table has been revised as suggested.
255.	3606	NA	WS 15	Solid-Other	Cyanide TQL is incorrect.	Revise to 0.1 µg/kg (Region 5 Sediment ESL)	The value has been revised as suggested.
256.	3606	NA	WS 15	Solid-8270	Benzaldehyde RSL from November 2012 RSL tables can be used as TQL.	Add Industrial Soil RSL (divided by 10) as TQL for benzaldehyde: 10,000 mg/kg	The table has been revised as suggested, based on the most recent RLS tables (May 2013).
257.	3606	NA	WS 15	Solid-8260	RSLs for some VOCs from November 2012 RSL tables can be used as TQLs.	Add Industrial Soil RSL (divided by 10) as TQL for bromochloromethane (68 mg/kg),	The table has been revised as suggested, based on the most recent RLS tables (May 2013).

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						cis-1,2-dichloroethene (200 mg/kg), and cyclohexane (2,900 mg/kg)	
258.	3606	NA	WS 15	Aqueous-8270	Benzaldehyde RSL from November 2012 RSL tables can be used as TQL.	Add Tapwater RSL as TQL for acetophenone and benzaldehyde: 1,500 µg/L	The table has been revised as suggested, based on the most recent RLS tables (May 2013).
259.	3606	NA	WS 15	Aqueous-8260	RSLs for some VOCs from November 2012 RSL tables can be used as TQLs.	Add Tapwater RSL as TQL for bromochloromethane (83 µg/L), cis-1,2-dichloroethene (28 µg/L), cis-1,3-dichloropropene (0.41 µg/L), cyclohexane (13,000 µg/L), methyl tert-butyl ether (12 µg/L), trans-1,3-dichloropropene (0.41 µg/L)	The table has been revised as suggested, based on the most recent RLS tables (May 2013).
260.	3606	NA	WS 15	Aqueous-Other	RSLs for HAAs and orthophosphate available from November 2012 RSL tables can be used as TQLs.	Add Tapwater RSL as TQL for monochloroacetic acid (31 µg/L), dichloroacetic acid (1.3 µg/L), trichloroacetic acid (6.9 µg/L), and orthophosphate (760,000 µg/L).	The table has been revised as suggested, based on the most recent RLS tables (May 2013).
261.	3606	WS15	Aqueous 1668		No "low resolution" dioxin/furan or PCB methods listed. This also should be reflected in WS19 and WS23.	Include 680/8270M for PCBs and a HRGC/LRMS method for dioxins/furans. WS 19 & WS23 would also require updating	Pending results from the DMA, ERM may request a modification or amendment to the Phase 1A SAP to describe the use of Modified Method 680.
262.	3606	WS15	Solid 1668		No "low resolution" dioxin/furan or PCB methods listed. This also should be reflected in WS19 and WS23.	Include 680/8270M for PCBs and a HRGC/LRMS method for dioxins/furans. WS 19 & WS23 would also require updating	Pending results from the DMA, ERM may request a modification or amendment to the Phase 1A SAP to describe the use of Modified Method 680.
263.	3640	WS15	Solid 1668		Method should be 1668A for consistency with WS19 & WS23	Make Method 1668A	The table has been revised as suggested.
264.	3720	WS1	Aqueo		Method should be 1668A for consistency	Make Method 1668A	The table has been revised as

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		5	us 1668		with WS19 & WS23		suggested.
265.	4018	145	WS17, Introduction		Revise text as suggested	…SOPs that will be developed by ERM and reviewed and approved by USEPA.	The text has been revised as suggested.
266.	4026	145	17.1		As written the SAP is incorrect. Analytical groups are not specified in either WS11 or WS14.	The text needs to be revised accordingly.	The text has been revised as suggested.
267.	4045	145	17.2		Delete the word "requirements." The referenced USEPA QA/G-6 document is guidance only.	All SOPs for the Phase 1A RI will conform to the ~~requirements and~~ guidelines of the USEPA quality system…	The text has been revised as suggested.
268.	4047-4080	145-146	17.2		The text on line 4048 should be revised as suggested. The SOP format presented in this section is copied from Section 4.1 of the USEPA QA/G-6 guidance document, where these elements are provided as an example that "may be appropriate" and that "not all will apply to every procedure." Furthermore, Section 1.4 of the USEPA QA/G-6 guidance document states that SOPs should be "not wordy, redundant, or overly lengthy. Keep it simple and short."	The format for technical SOPs shall include the following elements, when appropriate:	The text has been revised as suggested.
269.	4094	146	17.2.1		Delete the references to "multi-level" and "from unconsolidated sands and silts," as these terms are unnecessary and not consistent with the sampling description in WS 14.	Methods for the sampling of soil must allow for the collection of ~~multi-level~~ samples as described in WS14.	The text has been revised as suggested.
270.	4098	147	17.2.1		Replace the sentence "Samples for lithologic logging will be collected continuously throughout each boring using a continuous core sampler," as continuous	Soil samples will be logged according to the Standard Practice for Classification of Soils for Engineering Purposes (Unified	The text has been revised as suggested.

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					core samplers may not be used or suitable at all subsurface sampling locations, and this statement is inconsistent with the SOPs developed for the DMA.	Soil Classification System, or "USCS"), as described in the surface and subsurface soil sampling SOPs.	
271.	4102-4103	147	17.2.1		Replace the sentence "The EnCore sampler will be deployed into undisturbed or minimally disturbed surface soil at each required sample location, or from the core sampling sleeve for subsurface samples before the sleeve is sealed and submitted for analysis." with the suggested text. Surface soil/sediment samples will only be analyzed for VOCs within the active wastewater ditches and when soil/sediment is saturated. No sealed sleeves will be submitted for analysis; all samples will be homogenized in the field. Considering USEPA's concerns over reactivity/off-gassing of sediment samples from active wastewater ditches, a statement should also be added to reflect the agreement to collect a sample aliquot into a vial containing methanol preservative. WS 19 also requires correction for footnote 4, to identify that methanol vials will only be collected at active wastewater ditches.	When VOC analysis is required, the EnCore sampler will be deployed into undisturbed or minimally disturbed soil/sediment prior to sample homogenization. Sediment samples for VOC analysis from active wastewater ditches will be collected using both EnCore samplers and by collecting 5 grams of sediment into a vial containing methanol preservative, as described in WS 19.	The text and Worksheet #19 have been revised as suggested.
272.	4132	147	17.2.2		The sentence starting on this line specifies the requirement for SOPs for low-flow sampling, installation and development of wells, and water level measurements, and notes that this requirement is described in WS14. WS14 needs to be expanded to specify the timing/frequency and locations of water level measurements and the use of	The text needs to be revised accordingly.	The text has been revised to clarify requirements for water level measurement timing and locations.

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					low flow sampling techniques. The relevant SOPs should also be cited in WS14.		
273.	4134	147	17.2.2		Delete reference to "shallow water probes," as these are not included in the investigation approach described in WS 11 and WS14. The measurement of water levels will be performed during low-flow sampling and does not need to be called out in the text. Water level measurements do not support the DQO of COPC selection.	...must include the sampling of wells and piezometers using low-flow techniques and the installation and development of new permanent ~~water probes~~ shallow and nested monitoring wells.	The text has been revised to delete any reference to water probes.
274.	4137	147	17.2.2		The statement that surface water locations are required to be coupled with sediment locations is not consistent with multiple sample locations shown in the WS 14 figures. One or more surface water sample locations in PRI Areas 1, 5, 6, and 7 are not co-located with sediment sample locations on the respective SAP sampling strategy figures for these PRIs.	The text and figures need to be revised accordingly.	The figures have been revised as suggested.
275.	4146	147	17.2.2		Suggested rewording of SOP requirement	"Installation and development of new groundwater ~~sample probes and~~ monitoring wells"	The text has been revised as suggested.
276.	4146	148	17.2.3		Delete reference to "groundwater sample probes," as these probes are not included in the investigation approach described in WS11 and WS14.		The text has been revised as suggested.
277.	4147	148	17.2.2		Suggested rewording of SOP requirement	"Surface water sampling from shorelines and ~~boats~~ structures or equipment on water surface"	The text has been revised as suggested.
278.	4207	151	WS18		When completed correctly, WS18 includes most of the information that the sampling	Revise WS18 to include for every sample:	Tables 14-1 and 14-2 have been revised to include sample locations

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					team will need in the field. It should include sample IDs for every proposed sample, X,Y coordinates, analytical methods, SOP reference and rationale for that location. This should be done for EVERY proposed sample. WS18 as it stands now is too general and summary and does not include the detailed information necessary to carry out the field work for Phase 1A.	- Sample ID; - x,y Coordinates (e.g., UTM); - Analytical methods; - Sampling SOP reference; and - The rationale for that location.	identification numbers, coordinates (northings and eastings), and the rationale for the collection of each sample.
279.	4207	153	WS18	WS18 - PRI Area 8	The Draft SAP states that aerial photos indicate overflow from PRI 6 into PRI 7; however, this appears to be a typographical error as this section of the SAP is describing PRI 8. Historical photographs that were used to judgmentally place sample locations should be included in a photo log as part of the administrative record for the Phase 1A SAP. If other information was used to judgmentally place sample locations, this information should be included in WS 10.	Correct text for PRI 8 rationale to read "...where aerial photos indicate over flow from PRI 6 into PRI 7." Include the aerial photos, and other historical information used to judgmentally place sample locations, in WS 10. Identify which sample locations (in WS 18 and in WS 14 Figures) were judgmentally placed.	Tables 14-1 and 14-2 have been revised to include the rationale for the collection of each sample. Specific references to PRI-6 and PRI-7 have been removed.
280.	4207	154	WS18	WS18 - PRI Area 11	It is unclear how a systematic grid could "avoid" paved areas, as is indicated in Sampling Rationale.	Identify sample points that were placed by judgment and included an explanation of the rationale used to develop sample design in DQO step 7.	Worksheet 18 has been revised to remove reference to a systematic grid for PRI-11. As noted above, Worksheet #14 has been revised to identify which samples were located using professional judgment.
281.	4210	151	WS18 , PRI 1		USEPA should provide rationale for proposing one subsurface sample at the former Boron Ditch, as this seems inconsistent with the multiple samples collected in active ditches. USEPA should also provide rationale for excluding		The rationale for subsurface sampling is provided in Worksheet #11. The rationale for the locations of subsurface samples is presented in Worksheet #14. It is not necessary to provide rationale for samples NOT

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					samples within the ditch spoils areas.		collected.
282.	4210	151-158	WS18		General comments on WS 18: • WS 18 (and the WS 14 figures) must include identifiers for the sample locations. • "Professional Judgment" seems to be heavily relied upon for sample location selection. Professional judgment is not discussed as a basis for sample design in the DQO process presented in WS 11.		As noted above, Worksheet #18 and Worksheet #14 have been revised to provide sample identifiers, and the use of professional judgment has been identified as part of the rationale for sample location, where appropriate.
283.	4210	151	WS18, PRI2		WS 11 describes the former diversion ditch as a potential preferential pathway for groundwater migration. There is no discussion of this feature in WS 11 for soils; therefore, it is not clear why subsurface soil samples are being proposed at the Landfill along this feature.		The text has been corrected. Worksheet #14 has been revised to identify which samples were located using professional judgment.
284.	4210	152	WS18, PRI 3		No subsurface samples at PRI 3 were discussed during the scoping process, and there is no rationale provided to indicate that the contaminant concentration or composition would be significantly different at depth.	Provide detailed technical rationale for subsurface sampling, or omit this sample from the Phase 1A SAP.	Worksheet #11 already explains why subsurface samples are needed in some PRIs. See response to comment 5.
285.	4210	152	WS18, PRI 5		WS18 should indicate how the second subsurface boring location was selected, and on what basis USEPA has assumed where the sediment will be thickest. Why would the sediment not be thickest at the outfall of the Main Ditch? It should be noted that during the DMA, the depth to native material was observed to be less than 6 inches.	Provide detailed technical rationale for subsurface sampling, or omit this sample from the Phase 1A SAP.	As noted above, Worksheet #14 has been revised to provide rationale for all judgmental samples.

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286.	4210	153	WS18, PRI6		Does USEPA mean thickest" instead of "saturated"? Saturated sediment is observed to occur within a large portion of PRI 6. USEPA should provide the basis for the sample location selection, e.g., historical aerial photographs, survey data, or field observations. It should be noted that during the DMA, the depth to native material was observed to be less than 6 inches.	Provide detailed technical rationale for subsurface sampling, or omit this sample from the Phase 1A SAP.	The table entry has been revised to say "thickest." See response to comment 5. As noted above, Worksheet #14 has been revised to provide rationale for all judgmental samples. Worksheet #14 has also been revised to clarify drilling depths expected for boring samples with respect to native materials.
287.	4210	153	WS18, PRI 7		WS18 should indicate how the second subsurface boring location was selected. It should be noted that during the DMA, the depth to native material at the historic inlet to PRI 7 was observed to be less than 6 inches. There is no rationale provided to indicate that the contaminant concentration or composition would be significantly different at depth.	Provide detailed technical rationale for subsurface sampling, or omit this sample from the Phase 1A SAP.	The rationale for the location of subsurface boring has been added to Worksheet #14. The text has been modified to specify the depth of the borings.
288.	4210	153	WS18, PRI 8		Native material is present at the ground surface within PRI 8, i.e., there is no evidence of waste disposal or filling in this PRI. It is therefore unclear how USEPA has assumed a 4.5 foot depth to native material in this PRI. Scoping discussions for this PRI considered subsurface sampling for characterizing potential exposures of burrowing animals resulting from subsurface transport of impacted wastewater, not waste thickness.	Provide detailed technical rationale for depth of subsurface sampling.	See response to comment 287.
289.	4210	154	WS18, PRI 10		WS 18 identifies 10 sample locations at PRI 10; however, 14 sample locations are shown in this PRI on Figure 14-9.	Revise the text and figures to be consistent.	The text has been revised to ensure consistency.
290.	4210	155	WS18		Native material is present at the ground	Provide detailed technical	See response to comment 288.

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			, PRI 14		surface within PRI 14, i.e., there is no evidence of waste disposal or filling in this PRI. It is therefore unclear how USEPA has assumed a 4.5 foot depth to native material in this PRI. There is no rationale provided to indicate that the contaminant concentration or composition would be significantly different at depth..	rationale for depth of subsurface sampling.	
291.	4210	156	WS18 , PRI 17		The statement that surface water locations are required to be coupled with sediment locations is not consistent with multiple sample locations shown in the WS 14 figures. One or more surface water sample locations in PRI Areas 1, 5, 6, and 7 are not co-located with sediment sample locations on the respective SAP sampling strategy figures for these PRIs.	Revise the text and figures to be consistent.	The figures have been revised so that surface water and sediment samples are co-located.
292.	4210	156	WS 18	18-1	First and last columns on this page should also include Wastewater.	Add Wastewater to first and last columns.	The table has been revised as suggested.
293.	4210	156	WS 18	18-1	"rational" in last row of table should be "rationale"	correct spelling	The table has been revised as suggested.
294.	NA	156		WS-18	The tally of surface water samples (31) is consistent with Figure 14-13, and does not reflect collection of Skull Creek Diversion water. (see comment on line 3422)	The text needs to be revised accordingly.	The text has been revised to accurately reflect the number of surface water samples.
295.	4210	157	WS18 , PRI 17		Hexavalent chromium [Cr(VI)] should be included as an analytical group for surface water and groundwater, based on post-DMA analytical method discussions. ERM has proposed Cr(VI) analysis by IC-ICP-MS. See comment on WS-15 for method information.	WS18 needs to be revised to include Cr(VI) analysis by IC-ICP-MS for surface water and groundwater at PRI 17.	Worksheet #18 has been revised to add chromium VI to the water analyses.
296.	NA	157		WS-	See comment on line 2471 regarding	The text needs to be revised	The text has been revised and the

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				18	inconsistent tallies of monitoring wells in the SAP	accordingly.	tallies have been checked for consistency.
297.	4210	158	WS18, PRI 18		PM10 is missing as an analytical group from WS 18 for the ambient air PRI.	WS18 needs to be revised to include PM10.	Worksheet #18 has been revised as suggested.
298.	4233	159	WS 19	19-1	Add LRMS Method 680 to PCB analytical method	USEPA Method 1668A or 680	See response to comment 149.
299.	4233	159	WS-19	19-1	ERM submitted a revised version of WS19 to USEPA on April 17, 2013. The information in this version should be incorporated into the final worksheet.	Use revised WS19 submitted by ERM on April 17, 2013.	Worksheet #19 reflects the revision received from ERM on 8 Aug 2013.
300.	4233	159-163	WS19		WS19 needs to clarify that MeOH vial samples are for sediment samples from wastewater ditches only, and add the preservation requirements for HAA		Worksheet #19 reflects the revision received from ERM on 8 Aug 2013.
301.	4233	160	WS 19	19-1	Add LRMS Method 680 to PCB analytical method	USEPA Method 1668A or 680	See response to comment 149.
302.	4233	162	WS 19	19-1	Add Cr (VI) Method 7199-Modified (IC-ICP-MS) to table.	Fill cells as follows: Aqueous/Hexavalent Chromium/USEPA Method 7199-Modified [SOP TBC]/1 x 125-mL HDPE/10 mL/Field-filtered with 0.45 µm filter and adjusted to pH 9-9.5. If salts are formed during pH adjustment, refilter the sample/24 hr.	Worksheet #19 reflects the revision received from ERM on 8 Aug 2013.
303.	4233	162	WS-19	19-1	Haloacetic acid preservation requirements were revised to address the chlorine levels in the wastewater samples in the WS19 version submitted by ERM on April 17, 2013.	Use revised WS19 submitted by ERM on April 17, 2013.	Worksheet #19 reflects the revision received from ERM on 8 Aug 2013.
304.	4239	162	WS 19	19-1	Holding times shown are for extracts stored at room temperature. Extracts for	Update table as with correct hold times.	Worksheet #19 reflects the revision received from ERM on 8 Aug 2013.

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					organic analyses stored in freezer are valid for up to one year from extraction.		
305.	4240	162	WS 19	19-1	Note 4 is not used in the table and only applies to ditch sediment samples. The revised worksheet provided by ERM provides the information needed for collection of saturated sediment samples from ditches.	Use revised WS19 submitted by ERM on April 17, 2013.	Worksheet #19 reflects the revision received from ERM on 8 Aug 2013.
306.	4241	162	WS 19	19-1	Note 5 is not used in the table, and ounce is misspelled.	Correct "ouce" to "ounce."	Worksheet #19 reflects the revision received from ERM on 8 Aug 2013.
307.	4243	163	WS 19	19-1	Note 6 is not used in the table.	Omit Note 6	Worksheet #19 reflects the revision received from ERM on 8 Aug 2013.
308.	4245	163	WS 19	19-1	Note 7 is not used in the table.	Omit Note 7	Worksheet #19 reflects the revision received from ERM on 8 Aug 2013.
309.	4276	167	D	header	Header should be Section E Quality Assurance. This is the first page of WS 20.		The header has been revised.
310.	4276	168	E	header	Header on this page and following pages: Quality is misspelled; please correct. Also, add "WS #20" after "Draft Phase 1A SAP,"		The header has been revised and the typographical error has been corrected.
311.	4278	167-171	WS20		• The values for "number of samples collected" does not agree with the number of samples identified in WS 18 for PRIs 1, 2, 3, 4, 5, 6, 7, 8, 10, 14, and 17. • WS 20 is incomplete, as it does not include field QC samples associated with the Air PRI (PRI 18). • Delete reference to USEPA CLP SOW in footnote c. CLP SOW methods are not being used for Phase 1A. • The number of equipment blanks,	WS20 needs to be revised accordingly.	• Worksheet #20 has been reviewed to ensure numbers for field and QC samples (estimated as noted) are correct. • Worksheet #29 has been revised to include preliminary QA/QC information for air. This information may be further revised as appropriate after the Air DMA. • Reference to the CLP SOW has been removed. • Worksheet #12 has been revised to be consistent with Worksheet #20,

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					though estimated, do not correspond with the frequency specified in WS 12 (one per day per sampling team), as multiple days will be required to perform sampling at all PRIs. ERM has commented elsewhere that the one per day frequency for equipment blanks specified in WS 12 is unnecessary and unrealistic.		to specify that equipment blanks should be collected at a frequency of one per day per sampling team.
312.	4279	167	WS 20		Table is not numbered.	To be consistent with other worksheets, table should be numbered 20-1.	The table has been numbered as suggested.
313.	4279	167	WS 20		Consistent with comments on WS-12, some field QC sample frequencies can be reduced without affecting the ability to evaluate data quality. Field duplicates will be collected such that at least one duplicate of each matrix type is collected.	Revise estimated number of field duplicates for each PRI except 17 to 1. For PRI 17: "1 of each matrix type (3 total)."	Some field duplicate sample frequencies have been adjusted to be consistent with the final number of field samples identified in Worksheet #14. However, generally, the number of QC samples specified in the SAP is in accord with standard EPA practice, and no reduction in number is appropriate.
314.	4279	167	WS 20		Consistent with comments on WS-12, some field QC sample frequencies can be reduced without affecting the ability to evaluate data quality. Equipment rinsate blanks will be collected at a frequency of one per week per type of non-dedicated sample collection equipment used.	Revise estimated number of equipment rinsate to one per week.	See response to comment 313.
315.	4288	171	WS-20		The number of aqueous samples to be collected that is listed here under PRI 17 (59) is consistent with an assumed 31 surface water samples and 28 groundwater samples (18 existing wells, 6 new shallow wells, 4 total nested wells), and does not	WS20 needs to be revised accordingly.	The worksheet has been revised as suggested.

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					reflect collection of Skull Creek Diversion water samples.		
316.	4295	171	WS 20		Frequency of equipment blanks can be reduced.	Change "days" to "weeks"	See response to comment 313.
317.	4299	171	WS 20		WS 20 does not include field QC samples for air matrix.	Include information for air matrix field QC samples in WS 20.	The WS has been revised to address air QC samples.
318.	4328	183	WS 23	23-1	Add rows for Method 680 for PCB analysis for solid and aqueous samples	ERM will provide Lab SOP Number, Title, etc.	See response to comment 149.
319.	4328	183	WS 23	23-1	WS-MT-0001 title is incorrect	change "Couple" to "Coupled"	The title has been revised as suggested
320.	4328	183	WS 23	23-1	Show headers on every page of table		Headers have been added as suggested.
321.	4328	183-189	WS23		ERM submitted a revised version of WS23 to USEPA on April 17, 2013. It includes Project-Specific Work Instructions as needed for sample collection and analysis. The information should be incorporated into the final worksheet.	Use revised WS23 submitted by ERM on April 17, 2013.	Worksheet #23 reflects the revision received from ERM on 8 Aug 2013.
322.	4328	184	WS 23	23-1	Add perchlorate specifics	SOP # WS-WC-0010; Determination of Perchlorate by Ion Chromatography (Method 314.1), Revision 5; IC	Worksheet #23 reflects the revision received from ERM on 8 Aug 2013.
323.	4328	184	WS 23	23-1	Add row for Cr (VI) by Method 7199-modified.	ERM will provide Lab SOP Number, Title, etc.	Worksheet #23 reflects the revision received from ERM on 8 Aug 2013.
324.	4328	185	WS23		The DMA results clearly showed that the in-field sample homogenization and laboratory sub-sampling procedures used resulted in excellent agreement between primary and laboratory duplicate samples. Revision of the sub-sampling SOP is therefore not necessary to achieve the Phase 1A DQO.	Subsampling and Compositing of Samples ~~(to revised by ERM based on DMA)~~	Worksheet #23 reflects the revision received from ERM on 8 Aug 2013.

ATTACHMENT 4
EPA Responses to ERM Comments on May 2013 Draft Phase 1A SAP

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
325.	4331 - 4354	186-187	WS23		CLP SOW methods are not being used for Phase 1A.	Delete "CLP" and "SOW" from table footnotes.	Worksheet #23 reflects the revision received from ERM on 8 Aug 2013.
326.	4372	214	WS 24	24-1	Perchlorate method information needs to be added for Method 314.1.	ERM will revise this table to include information for Perchlorate Method 314.1.	ERM may request a modification to the table to include information to be provided by ERM on 30 Aug 2013.
327.	4372	214	WS 24	24-1	Add Cr (VI) by Method 7199-modified	ERM will provide Lab SOP Number, Title, etc.	ERM may request a modification to the table to include information to be provided by ERM on 30 Aug 2013.
328.	4400	224	WS 25		Add Cr (VI) by Method 7199-modified	ERM will provide equipment information.	ERM may request a modification to the table to include information to be provided by ERM on 30 Aug 2013.
329.	4400	224	WS 25		Information needs to be added for Perchlorate Method 314.1.	ERM will provide equipment information.	ERM may request a modification to the table to include information to be provided by ERM on 30 Aug 2013.
330.	4429	231	WS26	Table 26-1	Table 26-1 is blank; however, this information has previously been provided to USEPA during the development of the DMA Work Plan.		ERM may request a modification to the table to include information to be provided by ERM on 30 Aug 2013.
331.	4429	231	WS 26	26-1	This table does not contain information for sample handling of solid and aqueous samples.	Indicate that ERM will provided this information.	ERM may request a modification to the table to include information to be provided by ERM on 30 Aug 2013.
332.	4442	235	WS27		This worksheet appears to have been developed prior to the definition of PRI areas or the scope of work for Phase 1A, and to have not been revisited by USEPA during the scoping process. ERM has already provided Sample Custody Requirements to USEPA during the development of the DMA Work Plan. ERM's WS 27 should be the basis of WS 27 in the SAP, and USEPA should provide comments, if any, to the DMA WS 27 prepared by ERM.	Replace with DMA WS 27 prepared by ERM.	Worksheet #27 has been revised to reflect materials submitted by ERM.

ATTACHMENT 4
EPA Responses to ERM Comments on May 2013 Draft Phase 1A SAP

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
333.	4448	235	WS27, Sect 27.1.1		Sample identification scheme should agree with sample identifiers on WS 18 and in the WS 14 Figures; however, as commented previously, the USEPA draft SAP fails to provide identifiers for the proposed sampling locations, and the worksheet contains numerous errors.	The SAP needs to provide identifiers for the proposed sampling locations.	A sample nomenclature has been defined in Worksheet #27. The sample location identification numbers are provided in Worksheet #14.
334.	4449	235	WS27, 27.1.1		The sample identification scheme described in this section is incomplete and inconsistent with the scope of sampling described in WSs 11, 14, and 18 of the SAP. Specific errors/deficiencies in this section include: • No temporary wells are proposed for Phase 1A; • It is unclear whether the "PRIAreaNo" for water samples refers to the PRI Area where the sampling point is located (PRIs 1 – 16), or if this will be PRI-17 (site-wide water) for all samples; • The same is true for air samples, where there is only one air PRI; • Sample IDs for soil boring / sub-surface samples should include the depth interval or beginning depth of the sample; • The discussion of sample IDs being generated by the database manager and consisting of a letter followed by four numbers is inconsistent with USEPA's own suggestion for sample naming provided in the DMA Oversight Report (SAP Attachment	• Replace with DMA WS 27 prepared by ERM; • Delete reference to temporary wells; and • Sample IDs should include the following formats: o Surface soils: PRI##-SS##-MMDDYY o Soil borings: PRI##-SB##-Beginning Depth (ft)-MMDDYY o Surface Water: SW##-MMDDYY o Groundwater : Well ID-MMDDYY o Ambient Air: Air##-Method-MMDDYY o Duplicates should be appended with a "D" o Equipment Blanks: PRI##-EB-MMDDYY; o Trip Blanks: TB-MMDDYY	Worksheet #27 has been revised to reflect materials submitted by ERM and the comments.

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
					11F), which suggests that sample IDs should be of the format: PRI ##-MEDIA (either solid, surface water, or groundwater)-DATE-SEQUENTIAL NUMBER.		
335.	4571	239	WS 28	28-1	Add LRMS Method 680 for PCB analysis	ERM will provide this table with the necessary Method 680 information	See response to comment 149.
336.	4571	239	WS 28	28-1	Perchlorate analysis of solid samples by Method 314.1 is missing.	Add Perchlorate analysis of solid samples by Method 314.1.	ERM may request a modification to Worksheet #28 to include information to be provided by ERM.
337.	4571	239	WS 28	28-1	Add Cr(VI) by Method 7199-modified	Add Cr(VI) by Method 7199-modified.	ERM may request a modification to Worksheet #28 to include information to be provided by ERM.
338.	4673	267	WS 30		The laboratory selection and procurement process described in Sections 30.1 and 30.2 of the draft Phase 1A SAP is inconsistent with USEPA's UFP-QAPP Manual (USEPA-505-B-04-900A) and should be deleted. Per the UFP-QAPP Manual, WS 30 does not include any information on laboratory procurement or assessment; this worksheet only identifies "…all laboratories or organizations that will provide analytical services" and "…if applicable, identify the subcontractor laboratories and backup laboratory or organization that will be used if the primary laboratory or organization cannot be used."	Replace lines 4673 to 4685 with the following text: "The laboratories contracted to provide analytical services (and backup laboratories, if needed) as shown in the following table have the appropriate accreditation or certification (National Environmental Laboratory Accreditation Conference [NELAP] or State of Utah) for each analytical method and matrix, if available. Some specialized analytical methods employed to attain greater sensitivity and/or accuracy for selected analytes are not yet included in NELAP or State of Utah accreditation/certification programs. ERM has requested	The text has been revised as suggested. ERM may request a modification to the table to include information to be provided by ERM on 30 Aug 2013.

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
						additional information from the laboratories to demonstrate their performance capabilities for these methods, including but not limited to standard operating procedures and QA/QC documentation for analyses of similar matrices."	
339.	4712	269	WS 31	NA	As noted, ERM will provide a table with the required information.		The information has been inserted.
340.	4738	271	WS 32	NA	As noted, ERM will provide a table with the required information.		The information has been inserted.
341.	4760	273	WS 33	NA	As noted, ERM will provide a table with the required information.		The information has been inserted.
342.	4787	275	WS 34	NA	As noted, ERM will provide a table with the required information.		The information has been inserted.
343.	4792	277	WS 35	NA	As noted, ERM will provide a table with the required information.		The revised table has been included.
344.	4801	279	WS 36		HCB should not be called out separately from SVOCs	Omit the individual reference HCB as it is included in the SVOC analysis.	Worksheet #36 has been revised as suggested.
345.	4801	279	WS 36		ERM will provide this table with the information needed.		ERM may request a modification to Worksheet #36 to include information to be provided by ERM.
346.	4856	282	36.1.4 .3		Text indicates a table to follow but none is presented. It appears that the table beginning at line 4799 should follow the text instead of preceding it.		The table has been repositioned as suggested.
347.	4860-4881	283	37		The introductory paragraphs of Section 37 are not consistent with the objectives for Phase 1A and should therefore be deleted.	Omit lines 4860-4881 and replace with: The evaluation of data usability of the Phase 1A data will include comparison of results to measurement quality objectives	The text has been revised as suggested.

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
						with subsequent evaluation against the DQOs, as described in the following sections.	
348.	545	34	10.2.4		Rewording warranted	~~"Monthly~~ Additional concurrent measurements of wastewater and groundwater elevation ~~data are needed to understand the role~~ would be helpful in assessing the relationship between wastewater levels and ~~plays on~~ groundwater flow and discharge patterns."	The sentence has been revised as follows: "Regular, concurrent measurements (i.e., monthly monitoring) of wastewater and groundwater elevations are needed to understand the influence of wastewater on groundwater flow and discharge patterns."
349.	NA			Figure 14 general comment	WS 14 Figures showing proposed sample locations should be modified as follows: • Identify in a different color or symbol those samples that were judgmentally located. • Provide sample IDs so specific samples can be discussed. Sample IDs should cross reference to a greatly expanded WS18 (see comments to line 4207). • Provide methodology for selection of grid size selected for each PRI, suggest adding to DQO Step 7. • Identify whether the systematic grid was laid randomly or judgmentally.	WS 14 figures should be modified as suggested in the comment.	Figures associated with Worksheet #14 have been revised to provide sample location identification numbers. Table 14-1 has been prepared to include the rationale for each sample location.
350.	NA			Figure 14-1	Why are there 4 samples in the Western Ditch before the confluence with the central ditch when 2 or 3 samples would provide adequate coverage? Why is there a third sample in the Central Ditch right before the confluence with the Main Ditch and another right next to it in the Main	Omit the redundant samples or provide technical rationale for why they are required for COPC selection. WS 14 figures and other relevant sections of the SAP providing sample design rationale (i.e., WSs 11 and 18) should be	Sample locations in the ditches have been revised and are shown in Figure 14-1.

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
					Ditch? Only the Main Ditch sample is necessary. Although it is not apparent how subsurface samples are relevant to the Phase 1A DQO, during the 20 February 2013 Phase 1A Scoping Meeting, it was agreed that subsurface sediment sampling within active wastewater ditches would be completed only at bridge crossings, and that two locations for subsurface sampling would suffice. It has been clearly stated that logistical challenges with subsurface sediment sampling in the ditches could be mitigated if existing access from bridges over the ditches are used. Figure 14-1 shows three subsurface sample locations in active ditches, two of which are not located at bridges.	modified as appropriate. Subsurface sample locations in active ditches should be reduced to two and moved to the two bridges.	
351.	NA			Figure 14-3	The sample grid is not even, as sample locations on the north and west side are off. Describe how the grid was developed and why it is not uniform. Identify which sample is judgmentally placed near the inlet Identify basis for speculating that "waste" is thickest at the location of the subsurface boring. During the scoping meetings, subsurface sampling at PRI-3 was discussed only for characterizing terrestrial habitat for burrowing animals, which is not relevant to the Phase 1A DQO of COPC selection. The subsurface sample locations shown in Figure 14-3 are therefore not required.	Provide detailed technical rationale for subsurface sampling relative to the Phase 1A DQO, or omit these samples from the SAP.	See responses to comments 5 and 9.
352.	NA			Figure	During the scoping meetings, subsurface	Provide detailed technical	See response to comment 5.

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
				14-4	sampling at PRI-4 was not discussed. The gypsum is a homogenous material that is not expected to show significant variations in COPC concentration or composition with depth. Therefore the collection of depth samples at locations shown in Figure 14-4 is not relevant to the Phase 1A DQO of COPC selection.	rationale for subsurface sampling relative to the Phase 1A DQO, or omit these samples from the SAP.	
353.	NA			Figure 14-5	There is no basis provided for the 16 samples proposed for this PRI, when 14 samples are considered sufficient for COPC selection. The number of samples should be reduced to 14. It is more appropriate to create a random systematic grid assuming 14 samples than assuming 16 samples, which would result in a grid size that was larger than 900x900. Two of the fourteen samples could then be moved to address specific site features that require judgmental placement. As commented elsewhere, USEPA has failed to provide sound technical rationale for collecting subsurface samples within PRI 5. Technical rationale must be provided as part of the DQO development to explain why deep sediment samples are required for COPC selection, or deep samples must be omitted from the Phase 1A SAP. Surface samples at PRI 5 will only be collected if they can be safely accessed. Safe access will generally be achieved by	Create a random systematic grid based on the 14 samples required to satisfy the statistical sample design criteria. Then, rather than adding bias samples, some of the randomly placed samples should be moved to address specific site features that require judgmental placement. This will satisfy the statistical sample design criteria and reduce overall sampling costs. Technical rationale must be provided as part of the DQO development to explain why saturated and deep sediment samples are required for COPC selection, or omit these samples from the Phase 1A SAP.	Worksheet #11 already provides a description as to why more than 14 samples are needed in some cases, and why the additional samples should be biased. If the locations of high concentration areas were known with confidence, the suggested approach might be acceptable. However, in most cases, the spatial patterns (both lateral and vertical) are not known with sufficient confidence to ensure that biased samples are actually located in high concentration areas. The approach specified in the SAP (14 grid samples plus several biased samples as needed) is considered to be a useful compromise that avoids the potential need to increase sample size even further to meet the DQOs for small home range ecological receptors. Worksheet #11 also provides rationale for why samples of saturated sediment and deep sediment are needed for COPC selection. As noted in the AOC, if ERM is unable or unwilling to collect such samples, the EPA will

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
					foot to locations that are not submerged. USEPA has not provided any technical justification to support why submerged sediments would have different COPC concentrations than saturated sediments adjacent to open water areas. ERM will not collect submerged sediment samples at PRI 5 unless safe access can be achieved.		collect the samples.
354.	NA			Figure 14-6	There is no basis provided for the 16 samples proposed for this PRI, when 14 samples are considered sufficient for COPC selection. The number of samples should be reduced to 14. Identify basis for speculating that "waste" is thickest at the location of the subsurface boring. As noted above, please provide technical rationale as to why deeper sediment samples are required for COPC selection, or omit these samples from the Phase 1A SAP. As commented above for Figure 14-5, USEPA has not provided technical justification as to why COPC concentrations would be different in saturated versus submerged sediments. ERM will not collect submerged sediment samples at PRI 6 unless safe access can be achieved.	As noted above, include the technical rationale in the Phase 1A SAP as to why 16 samples, including one deeper sediment sample, are required for COPC selection, or omit these samples.	See response to comments 5 and 9.
355.	NA			Figure 14-7	There does not appear to be a systematic grid at PRI 7. If there was, there would be at least one sample at the southern end of the lagoon. Additionally, the grid size seems smaller at the western side of the lagoon and larger on the northern and eastern side.	Provide detailed technical rationale for the irregular sample grid. Identify the basis for the sample distribution, and provide rationale for the three samples proposed at	Worksheet #14 has been revised to provide additional explanation of the rationale for sample locations.

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
					The three samples proposed at the barrow ditch appear to address nature and extent data needs and are not required for COPC selection. During the scoping meetings, subsurface sampling at PRI-7 was discussed only for characterizing terrestrial habitat for burrowing animals, which is not relevant to the Phase 1A DQO of COPC selection. The subsurface sample locations shown in Figure 14-7 are therefore not required.	the barrow ditch. Provide detailed technical rationale for the subsurface sampling relative to the Phase 1A DQO, or omit these samples from the SAP.	
356.	N/A			Figure 14-8	If the suspected source of contamination at PRI 8 is the adjacent PRI 6, then biased samples should be placed toward the boundary and fewer on the northern end of PRI 8 This could be accomplished by varying the grid size in two defined "strata." If a presumed source is groundwater flow from PRI6, then it would seem appropriate to propose additional subsurface sample locations in proximity to PRI 6.		The sampling locations have been revised to provide somewhat higher density along the southeastern border of the PRI, as suggested.
357.	NA			Figure 14-9	The basis for the high density of sampling within the cap at PRI10 is not provided. As the waste material is buried beneath three feet of fill at PRI10, it may appropriate to collect more subsurface samples than are proposed.		The number of samples in PRI-10 is 14, the same as most other PRIs. The higher density results from the relatively small size of PRI-10. However, the sample size is independent of size of the PRI, so all of the samples shown are required to achieve DQOs. Although only one boring is called for, more may be collected in subsequent phases of the RI, if needed.
358.	NA			Figure	There does not appear to be a systematic	Provide detailed technical	Worksheet #14 has been modified to

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
				14-11	grid at PRI-13 and PRI-14. A description of why the samples are all located next to the facility should be provided. The grid size stated on the figure must represent an area covering a sub-area of the entire PRIs; however, there is no discussion of how this sub-area was selected. The SAP should explain why aerial deposition is not considered to be a transport mechanism for PRIs 13 and 14. If the buffer areas on the western side (PRIs 15 and 16) have aerial deposition as a possible transport mechanism, then this seems applicable to the eastern side of the Site as well. This could be addressed in part by moving the second rows of samples farther afield to provide more coverage.	rationale for the irregular sample grid.	provide additional rationale for the placement of samples in PRI-13 and PRI-14.
359.	NA			Figure 14-12	There should be some recognition that there may be logistical challenges associated with random placement of samples in the Lakeside Mountains and there should be discussion about how to move sample locations based on ground conditions.	Include a systematic efficient SAP modification procedure for likely situations, such as the need to delete or relocate inaccessible samples, that does not require the burdensome and inefficient SAP change procedure included in WS6	See response to comment 234.
360.	NA			Figure 14-14	Footnote 1 on Figure 14-14 states that "Surface Water Samples will be co-located with sediment samples (see Figures 14-1 through 14-12) unless otherwise stipulated by USEPA." One or more surface water sample locations in PRIs 1, 5, 6, and 7 are not co-located with sediment sample locations on the respective SAP sampling strategy figures for these PRIs. This figure	This figure should have the location of the ditches identified so that the proposed surface water samples can be reviewed in the context of water features. An explanation for the distribution of sampling locations should be provided in the context	The basis for sample number is provided in Worksheet #11. Sampling maps have been revised so surface water and sediment samples are co-located. Sampling locations in ditches are shown in Figure 14-1. Worksheet #14 has been modified to provide rationale for sampling locations.

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
					does not have the location of the ditches identified so that the proposed surface water samples can be reviewed in the context of water features. The rational for the distribution of sampling locations is not provided, and it is not clear why so many water samples are required for COPC selection, especially as the selection process will be site-wide and not based on source. For example why are 10 samples required in PRI 1, or 5 samples in PRI 7?	of COPC selection.	
361.	NA			Table 10-1	As described in footnote a), this Table was not generated from the verified/validated data in the Project (EQuIS) database, but rather was culled from summary tables in a previous report, and therefor is incomplete and inaccurate. The data summary should be generated from the project database, not pieced together manually from historic reports. The following errors were identified in the table: • Table 10-1 includes samples collected within the courtyard of the Magnesium Plant, which is not within the RI/FS study area boundary. • Table 10-1 appears to be missing data from the 2003/2004 Focused Ecological Risk investigation conducted by Parametrix for US Mag. • On some occasions the data for the sample cited does not match the original data published for that sample	Generate Table 10-1 using the project database. In order to accurately illustrate historical results, the table should at a minimum include the following: a) the number of samples b) the number of ND results c) the range of DLs for ND results d) the number of detections e) the min and max detections f) the location of max detection	As noted previously, the historic data are viewed as providing a useful basis for development of the CSM, but a detailed statistical characterization of the historic data is not considered to be a necessary investment of time or effort, since the data may not be representative of current site conditions and will likely not be used in COPC selection.

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
					(as checked by our database and the original USEPA reports) • A significant fraction (approximately 30%) of the values listed in Table 10-1 are not reproducible from the database of verified/validated data. Examples include: cyanide, vanadium, 2-methylnaphthalene, benzo(a)pyrene, hexachlorocyclopentadiene, naphthalene, NDMA, chloroform, and dibromochloromethane. • There are multiple detected analytes missing from the list. Examples include: carbon tetrachloride, tetrachloroethene, and trichloroethene.		
362.	NA			Table 10-2	As commented for Table 10-1, Table 10-2 was not generated from the verified/validated data in the Project (EQuIS) database, but rather was culled from summary tables in a previous report. The summary should be generated from the project database, not pieced together manually from historic reports. The following errors were identified in Table 10-2: • Data are apparently both included from sampling completed at the barium sulfate area (1991) and the two 2005 groundwater sampling events • Approximately 25% of the values shown are incorrect due to the omitted	Table 10-2 should be generated using the project database. In order to accurately illustrate historical results, the table should at a minimum include the following: a) the number of samples b) the number of ND results c) the range of DLs for ND results d) the number of detections e) the min and max detections f) the location of max detection	See response to comment 361.

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
					data. • Multiple analytes are missing from the table, including hexachlorobutadiene, mercury, zinc, and anions.		
363.	NA			Table 10-3	Table 10-3, like Tables 10-1 and 10-2, appears to have been compiled manually from summary tables in other reports rather than using the project database, and therefor is incomplete and inaccurate. The "Site Areas" do not always correlate with the PRIs. The following errors were identified in Table 10-3: • Max number of samples is ambiguous. For arsenic the number of samples is a small fraction of this number, while for HCB there are more samples for some areas. The numbers shown are therefore misleading since each of the analytes is not necessarily analyzed for that many times. • The summary statistics appear to not include data collected for the 2003/2004 Focused Ecological Risk Assessment by Parametrix • The values shown for arsenic and HCB do not agree with the project database for multiple areas. PCB and D/F results could not be reproduced using the project database. In WS 11 (lines 2123 - 2131) USEPA states that it is premature to identify a relevant background concentration; however,	Table 10-3 should be deleted from the SAP, as this information would be captured in Table 10-1 if generated as recommended above. The Background concentration for arsenic should be explained/substantiated in the SAP or deleted.	The information on Table 10-3 was taken directly from existing site documents that are referenced in the tables. These tables are designed to show the concentrations of chemicals found at the site and are not intended to address the frequency of analyses or adequacy of detection limits. See responses to comments 78 and 79.

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
					Table 10-3 presents an unreferenced, unsubstantiated background concentration for arsenic.		
364.	NA			Figure 10-16	Please indicate the units on the figure.		The units have been added as suggested.
365.	NA			Figure 10-32	The legend should indicate what a dashed and a solid line means. The closed circles indicate potentially complete pathways from inhalation of surface water and groundwater to site workers and seems to assume volatiles in water and not direct ingestion of water. This is not consistent with existing data and site conditions. This pathway should be changed to incomplete.		The legend has been revised to indicate the meaning of solid and dashed arrows. The closed circles indicating direct exposure of US magnesium workers to waste water and other on-site waters have been changed to open circles, pending the findings of the human exposure survey. The solid black circles indicating inhalation exposure to VOCs released from water to air have been retained. Exposures from air will be based on direct measurements of COPCs in air. If the data indicate that no VOCs are released from water to air, the pathway will be excluded at that time.
366.	NA			Figure 10-33	This figure is pixelated and difficult to review. Arrows are not always complete, and are of varying widths. The criteria used to differentiate among closed and open circles and x's are not presented. It is premature at this point in the process to decide what pathways may or may not be evaluated quantitatively. For a general CSM, there is too much detail and splitting. For example, why are there so many categories of receptors? Why aren't herbivorous birds called out as a category? What is the difference between a sediment-	The Eco CSM should be significantly revised and simplified.	The figure has been revised as suggested.

No.	Line No.	Pg	Sect	Fig/ Tab No.	Comment	Suggested Rewording or Modification	EPA Response
					probing bird and an insectivorous bird in an aquatic habitat? Why are fish a category, but then they aren't included in any pathways? Are there even fish in the study area? Why are only mammals considered as tertiary sources in the soil part of the CSM? Wouldn't birds be possible tertiary sources as well? Why not just simplify and identify a generic prey category?		
367.	NA			Figure 14-14	The figure does not depict all of the existing groundwater monitoring wells - the figure should be modified to include all of the existing wells or only the wells proposed for sampling. See also comment on line 3422		The figure has been revised to include all of the groundwater monitoring wells and to indicate which will require monitoring during implementation of Phase 1A.
368.	NA	222-223	WS 25	page header	Header is incorrect	Need to add WS #25 to header	The header has been revised as suggested
369.	NA	224-230	WS 25	page header	Header is incorrect	Need to change 24 to 25 in header	The header has been revised as suggested.

ATTACHMENT 5

Agency Consideration of the RIFS Process for Inner PRIs: 1, 3, 4, and 5-7 (Ditches, Sanitary Lagoon, Gypsum Pile, and Waste Ponds)

Requirements for Approaches In Lieu of the Phase 1A SAP: A Screening Level Risk Assessment Process, or A Combined Phase 1A-1B Process

Under the Administrative Order on Consent (AOC) and Statement of Work (SOW), US Magnesium (USMag) agreed to carry out the Remedial Investigation and Feasibility Study (RIFS) process, which requires collection and evaluation of data to evaluate risks to human health and the environment. A finding of unacceptable risk requires evaluation of potential remedial actions to address those risks through a detailed analysis of alternatives in the Feasibility Study (FS). This information is required to support the Agency's remedy decision obligations under the NCP to select a remedy that is protective of human health and the environment.

During the scoping process and in documents submitted to the EPA, Environmental Resources Management (ERM), on behalf of USMag, has stated that:

- PRI 1could be remediated without further assessment (scoping session 1);
- conditions are too dangerous (extreme acidity) to warrant collection of samples for risk assessment within the high water lines of PRIs 5, 6 and 7 (scoping session 2) and that, due to the high levels of contamination, EPA should forego data collection in these areas,;
- omitting the sampling for chemicals of potential concern (COPCs) selection in PRIs 1, 4, 5, 6 and 7 and subsurface sediment collection in some of these PRIs is appropriate, because concentrations of all chemicals are high enough that no chemical classes would be eliminated from further consideration as COPCs;
- further sampling in these PRIs could be accomplished as part of a Phase1B (nature and extent) investigation; and
- remedial action is likely necessary for the ditches and waste lagoons.

In addition, ERM and USMag met with the EPA on July 9, 2013, and requested additional time to:

- resolve issues surrounding the use and applicability of the modified Method 680 for PCB analysis of highly-contaminated samples;
- resolve what ERM perceived to be outstanding issues regarding sampling of waste lagoons; and

- consider implementing a Phase 1B investigation in lieu of the planned Phase 1A COPC investigation.

At the July 9 meeting, the EPA agreed to:

- allow ERM to perform a site-specific evaluation of modified Method 680 for PCB analyses to resolve outstanding questions about the use of this method at the Site;
- postpone implementation of Phase 1A sampling for the inner PRIs until 2014; and
- convene a scoping meeting for timely consideration of an alternative approach to the Phase 1A investigation for the inner PRIs, to be implemented no later than 2014.

As one means of facilitating the RIFS process for the inner PRIs, the EPA offered to allow ERM and USMag to consider using the available site-specific pre-CERCLA data, in combination with the more recently acquired Demonstration of Methods Applicability (DMA) data, to carry out a Screening Level Risk Assessment (SLRA). This inherently conservative approach would allow the establishment of preliminary remediation goals (PRGs), which could then be incorporated into the FS for the inner PRIs. A benefit of this approach is that, by utilizing existing Site data, ERM and USMag could proceed to the FS stage prior to the completion of a Baseline Risk Assessment, which would otherwise involve further site characterization and a more refined risk evaluation. This alternate approach is consistent with the NCP and EPA guidance and would afford ERM and USMag the opportunity to reduce site risks to human health and the environment more quickly than completing additional site characterization and a Baseline Risk Assessment.

The EPA's proposed site characterization and risk assessment approaches for both the outer and the inner PRIs are outlined in the attached Figure 1: Risk Assessment Process Diagram. The approach shown for the outer PRIs is the approach currently contained in the Phase 1A SAP. The approach for the inner PRIs requires that ERM and USMag complete a SLRA of solid media and water using existing site data and adopt, for purposes of the FS, the PRGs identified after the refinement of COPCs. Due to the limitations of the existing site data and associated uncertainties, the approach for the inner PRIs outlined in the diagram does not allow for the elimination any COPCs through the SLRA step. The PRGs identified would be considered by the EPA and the State of Utah in establishing the remedial action objectives (pursuant to SOW Sec 5.5) that will form the foundation for:

- the development and screening of remedial alternatives (per SOW Sec. 6);
- treatability studies, if necessary (per SOW Sec. 7); and
- a detailed analysis of alternatives (per SOW Sec. 8) in the FS report (per SOW Sec. 9).

In order to accommodate a reasonable time frame for USMag to implement the alternate approach, the EPA has provided time within the Final Phase 1A SAP schedule for development of key components of the process. These components begin with a SLRA Technical Memorandum (predicated on pre-CERCLA/DMA data) and include a decision point at which US Mag may opt to advance the remedial response process by moving to the FS stage for one or more PRIs irrespective of site location (i.e., inner or outer PRI group). Regardless of the approach taken, however, the range of remedial alternatives considered during the FS stage must address risks from all of the PRIs in an integrated fashion and result in a final site-wide remedy that is protective of human health and the environment.

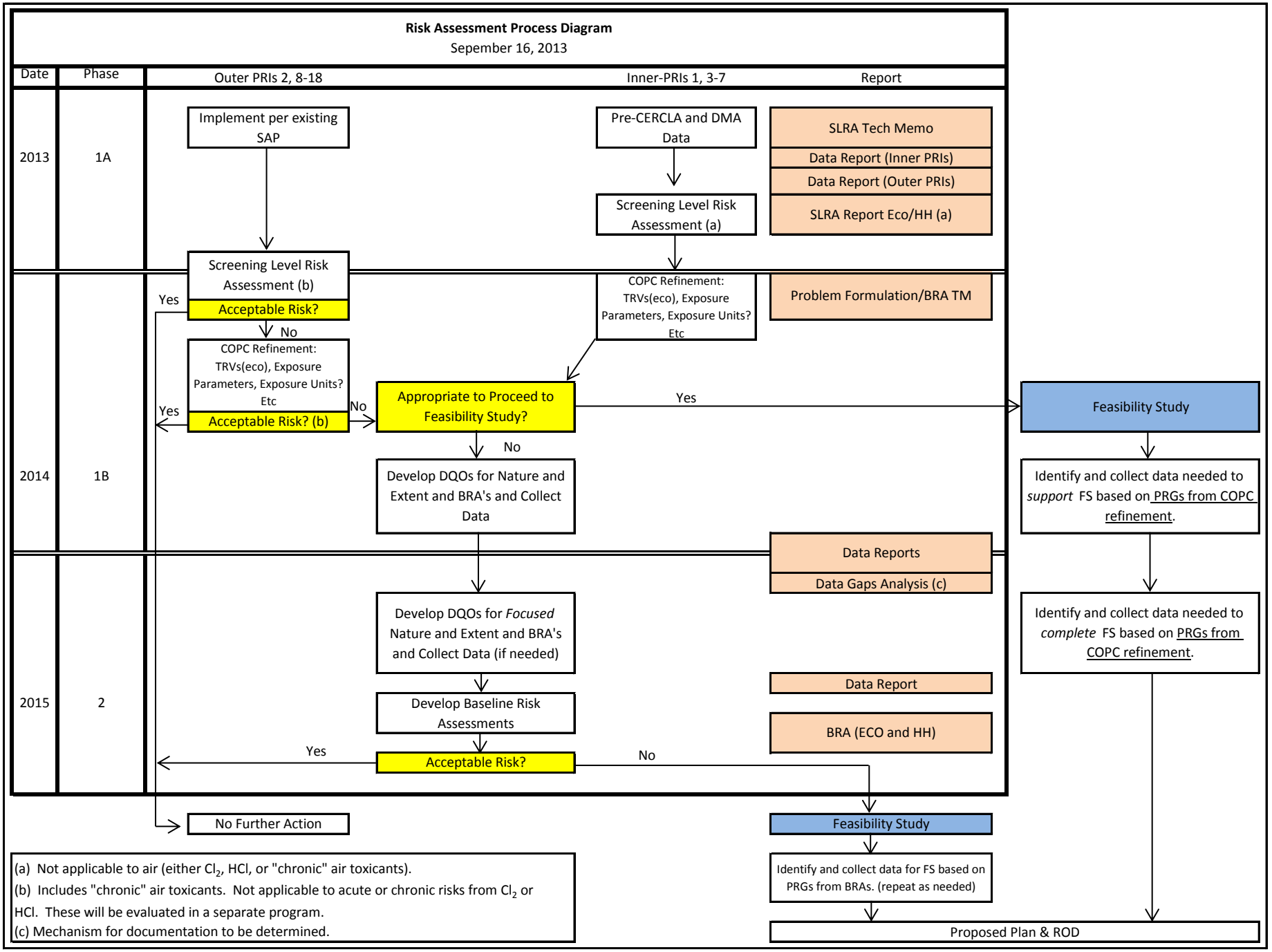
If USMag chooses to pursue this alternate approach, the EPA expects that USMag will, in good faith, work to meet timely schedule requirements for components of the alternate approach for the inner PRIs. In the absence of sufficient progress towards scheduled milestones in the risk assessment process, the EPA may require implementation of the Phase 1A SAP for the inner PRIs in early 2014 in conjunction with initiation of the Phase 1B scoping meetings in January 2014.

In summary, the timeline incorporated into the Final Phase 1A SAP:

- requires submittal of Standard Operating Procedures (SOPs) for the Phase 1A investigations of the inner PRIs in January 2014 and provides a window of time (January – April) for the development of a combined Phase 1A and 1B SAP for completion of inner PRI investigations in 2014, which the EPA would issue by May 15, 2014, unless USMag chooses to pursue the alternate approach; and
- allows the remainder of 2013 for development and submittal of the SLRA Technical Memorandum and SLRA completion, which may provide USMag a basis for moving directly to the start of FS scoping.

In the event USMag rejects the proposed alternate approach, the EPA expects the established RIFS process to continue without delay and in a manner that is consistent with the AOC, the NCP, and EPA policy and guidance.

Figure 1: Risk Assessment Process Diagram (September 16, 2013)


Risk Assessment Process Diagram
September 16, 2013
Date
Phase
Outer PRIs 2, 8-18
Inner-PRIs 1, 3-7
Report
2013
1A
Implement per existing SAP
Pre-CERCLA and DMA Data
SLRA Tech Memo
Data Report (Inner PRIs)
Data Report (Outer PRIs)
SLRA Report Eco/HH (a)
Screening Level Risk Assessment (a)
Screening Level Risk Assessment (b)
Acceptable Risk?
Yes
No
2014
1B
COPC Refinement: TRVs(eco), Exposure Parameters, Exposure Units? Etc
Problem Formulation/BRA TM
COPC Refinement: TRVs(eco), Exposure Parameters, Exposure Units? Etc
Acceptable Risk? (b)
Yes
No
Appropriate to Proceed to Feasibility Study?
Yes
No
Feasibility Study
Identify and collect data needed to support FS based on PRGs from COPC refinement.
Develop DQOs for Nature and Extent and BRA's and Collect Data
Data Reports
Data Gaps Analysis (c)
2015
2
Develop DQOs for Focused Nature and Extent and BRA's and Collect Data (if needed)
Identify and collect data needed to complete FS based on PRGs from COPC refinement.
Data Report
Develop Baseline Risk Assessments
BRA (ECO and HH)
Yes
Acceptable Risk?
No
No Further Action
Feasibility Study
Identify and collect data for FS based on PRGs from BRAs. (repeat as needed)
Proposed Plan & ROD
(a) Not applicable to air (either Cl2, HCl, or "chronic" air toxicants).
(b) Includes "chronic" air toxicants. Not applicable to acute or chronic risks from Cl2 or HCl. These will be evaluated in a separate program.
(c) Mechanism for documentation to be determined.

ATTACHMENT 6

PHASE 1A REMEDIAL INVESTIGATION SAMPLING AND ANALYSIS PLAN TO IDENTIFY CHEMICALS OF POTENTIAL CONCERN IN SOILS, SEDIMENT, SOLID WASTE, WATER AND AIR, AND RECEPTOR SURVEYS

US MAGNESIUM NPL SITE
TOOELE COUNTY, UTAH

September 2013

[CD-set attached]