ndep
NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
protecting the future for generations

STATE OF NEVADA
Department of Conservation & Natural Resources
DIVISION OF ENVIRONMENTAL PROTECTION

Brian Sandoval, Governor
Leo M. Drozdoff, P.E., Director
Colleen Cripps, Ph.D., Administrator

October 1, 2013

Mark Paris
Basic Remediation Company
875 West Warm Springs Road
Henderson, NV 89011

Curt Richards
Olin Corporation
3855 North Ocoee Street, Suite 200
Cleveland, TN 37312

Jay Steinberg
NV Environmental Trust
35 East Wacker Drive, Suite 1550
Chicago, IL 60601

Joe Kelly
Montrose Chemical Corp of CA
600 Ericksen Ave NE, Suite 380
Bainbridge Island, WA 98110

Charles Elmendorf
Stauffer Management Co LLC
1800 Concord Pike
Wilmington, DE 19850-6438

Richard Pfarrer
c/o TIMET – HSEA Dept.
PO Box 2128
Henderson, NV 89009

Re: **BMI Plant Sites, Regional Area and Common Areas Projects, Henderson, Nevada**
Regional Groundwater Response to Comments & NDEP Proposed BMI Regional Groundwater Goals and Directives

Dear Messrs.:

All of the parties listed above shall be referred to as "the Companies" for the purposes of this letter. The Nevada Division of Environmental Protection (NDEP) is providing guidance in the form of the BMI Proposed Regional Groundwater Goals and Directives (Goals and Directives) found in Attachment A of this letter. The NDEP will use the Goals and Directives to evaluate all final groundwater remedial selections proposed by the Companies. As stated in Attachment A of this letter the NDEP has a schedule for developing up-gradient groundwater quality numbers that will begin in the fall of 2013. The NDEP will share the proposed up-gradient groundwater quality work plan with the Companies prior to any work being completed.

Attachment B of this letter provides a response to comments submitted after the February 16, 2012 Regional Groundwater Meeting at the NDEP Las Vegas office. Comments submitted to the NDEP were considered when developing the Goals and Directives.

The NDEP is available to meet with each of the Companies either individually or if requested as a group to answer any questions specific to how final groundwater remedial selections will be evaluated at each location. The NDEP requests that any comments or questions related to the Goals and Directives be submitted to the NDEP for consideration within 60 days and not after December 1, 2013.

Please contact the undersigned with any questions or comments at jdotchin@ndep.nv.gov or 702-486-2850 Ext. 235.

Sincerely,

James (JD) Dotchin
Supervisor, Special Projects Branch
Bureau of Corrective Actions
NDEP-Las Vegas

JD:jd

Attachments (2)

ec: Greg Lovato, Bureau of Corrective Actions, NDEP
Weiquan Dong, Bureau of Corrective Actions, NDEP
Michael Friend, Bureau of Corrective Actions, NDEP
Adam Baas, Edgcomb Law Group
Allan Delorme, ENVIRON
Andrew Barnes, Geosyntec
Andrew Steinberg, Nevada Environmental Response Trust
Ashley Katri, McGinley & Associates
Brenda Pohlmann, City of Henderson
Brian Rakvica, McGinley & Associates
Brian Waggle, Hargis + Associates
Dave Share, Olin
Cassandra Joseph, AG's Office
Ebrahim Juma , Clean Water Team
Ed Modiano, de maximis, inc.
George Crouse, Syngenta Crop Protection, Inc.
Wayne Klomp, AG's Office
Jay Gear, Olin Co
Jeff Gibson, AMPACJeanette Daniels, AMPAC.
Joanne Otani
Joe Leedy, Clean Water Team
Joe McGinley, McGinley & Associates
John Pekala, Environcorp
Kirk Stowers, Broadbent & Associates
Kurt Fehling, The Fehling Group
Kyle Gadley, Geosyntec
Lee Farris, BRC
Mark Travers, ENVIRON
Matt Pocernich, Neptune & Company Inc
Michael Long, Hargis + Associates
Nicholas Pogoncheff, PES Environmental, Inc.
Paul Black, Neptune and Company, Inc.
Paul Hackenberry, Hackenberry Associates, LLC
Paul Sundberg,
Ranajit Sahu, BRC
Rebecca Shirclif, Neptune and Company, Inc.
Rick Kellogg, BRC
Stephen Tyahla, U.S. Environmental Protection Agency, Region 9
Tanya O'Neill, Foley & Lardner LLP
Teri Copeland

cc: David Sadoff, AIG Consultants, Inc., 121 Spear Street, 3rd Floor, San Francisco, CA 94105
Robert Infelise, Cox Castle Nicholson, 555 California Street, 10th Floor, San Francisco, CA 94104-1513

"Attachment A"

Proposed BMI Regional Goals and Directives

1. Containment of identified contaminants of potential concern (COPCs) at site property boundaries for groundwater above remediation standards will be a required performance measure for any selected long term groundwater remedy.
    a. Property boundary is the legal property boundary
    b. Remediation Standards will be defined as either BCL's or Background
2. Ultimate Remedial Action Objective (RAO) is to permanently restore the down gradient aquifer from site property boundaries to the Las Vegas Wash (the Wash) to below remediation standards.
3. All remedy evaluations must address all contaminants of potential concern (COPCs) discovered on the individual properties regardless of origin of these chemicals, including alleged trespass contaminants.
    a. All COPC's on site including regional indicator chemicals must be considered when evaluating and selecting a groundwater remedy
    b. Shallow water bearing zone should be the focus of the groundwater remedy, Middle and Deeper water bearing zones will be evaluated for potential vertical migration and impact to the Shallow water bearing zone. If these deeper water bearing zones are shown to significantly impact the Shallow Zone a groundwater remedy may be required for these deeper zones or locations where they interface with the Shallow Zone.
    c. The NDEP will determine the responsibility for implementation and/or cost of ultimate long term groundwater remedy implementation operation and maintenance for alleged trespass contaminants on a site by site basis.
4. Long term remedy evaluations can assume containment of COPC's at the up-gradient property boundaries for additional trespass contaminants. Alternatively the NDEP would consider a joint remedial option.
5. Up-gradient groundwater quality (i.e. CLO4, As, TDS)
    a. NDEP will develop and defend the definition of up-gradient groundwater quality.
    b. Costs for this activity may be apportioned as an All Company Task.
    c. Up-gradient groundwater quality may be different at each facility/property and may influence complex wide RAOs.
    d. If up-gradient GW exceeds remediation standards this will be considered with regards to site wide and downgradient RAOs.
6. In off-property areas where plumes are likely co-mingled, NDEP is developing a list of regional indicator chemicals, to serve as surrogates and drivers for determining whether individual plant site remedies are cumulatively protective and will achieve the off-site remedial action objective of aquifer restoration
7. In downgradient areas, NDEP will be evaluating the performance of achieving the remedial action objective along certain transect points of compliance. Performance metrics will likely include statistical evaluation of groundwater concentration trends, annual estimates of contaminant flux, hydraulic containment evaluations, mass discharge, and mass removal rates. Current transects being considered are:
        1. Property boundaries,
        2. Warm Springs Road,
        3. Galleria Drive/Athens Road (likely), and

4. Immediately up-gradient of the Las Vegas Wash.

8. Downgradient areas of the facilities site boundaries will be evaluated to determine the need for additional assessment or corrective actions after groundwater remedies are in place. If allocations are not developed by the companies; NDEP may perform work and seek reimbursement from the companies.
    a. Ecological risk would be considered after restoration of downgradient aquifer has been demonstrated or as a portion of the feasibility study (FS) under protectiveness and effectiveness.
    b. The groundwater (GW) remedy evaluation must also consider the vapor intrusion pathway in off-site areas.

"Attachment B"

NDEP's responses are provided after each comment in bold and italics for ease of reference.

BRC COMMENTS

1. Scope

The original MGA scope of work was to gather existing, "regional" available groundwater data from the various BMI Complex companies, as well as related entities such as Ampac, the City of Henderson, and SNWA for the purpose of determining if upgradient groundwater data gaps exist. The scope was expanded apparently to determine groundwater "data gaps" regionally, but there was no mention of how upgradient analyses would be conducted and, indeed, little discussion of the upgradient. The presentation did not address the purpose of the scope of work as originally described by the NDEP.

The scope of work for regional groundwater was appropriately addressed in the referenced presentation and in submittals to the NDEP. Additionally this was discussed at length at the February 2012 All Companies meeting. The path forward for up-gradient data gaps and the establishment of up-gradient regional contaminant concentrations will be addressed under the oversight of the NDEP and will be addressed in the coming Regional Goals and Directives.

2. Data Gaps

a. The work presented did not identify any BRC-related [i.e., BMI Common Areas] groundwater data gaps in the Shallow groundwater. This supports BRC's stated desire to proceed with the groundwater RAS/ROD for the Eastside.

   The NDEP disagrees that these data gaps are not BRC (East Side Common Areas) related due to the fact that the majority of the contamination on the common areas came from the individual plant sites through the conveyance pipes and trenches. The NDEP does agree that BRC should still proceed with the groundwater RAS/ROD for the Eastside in addition to the Regional Groundwater effort.

b. BRC disagrees with the implied and explicit characterization of a "Middle Zone" (MZ) of groundwater in the Eastside. The presence of a few sporadic, unconnected, barely moist stringers does not establish a Middle Zone. The preponderance of the data establishes that there is no such zone.

NDEP disagrees and notes that a Middle Zone appears to exist in at least parts of the BMI Complex and Common Areas. Additionally as a portion of the BRC common areas are down gradient of the plant sites all zones should be evaluated for potential impacts form these up-gradient sources. Further; as described in the Regional Goals and Directives, the main focus of the NDEP will be the restoration of the Shallow Zone, the deeper zones (other than shallow) will be evaluated to determine if there is a potential for significant contaminant upward mobility that may adversely impact the shallow zone.

c. The NDEP consultants noted three data gaps for the "Deep Zone" (DZ) within Eastside – a zone for which no monitoring was proposed. The gaps were noted as inconsistent data. BRC has examined the data from all three wells in question and can find no such inconsistencies. We would request the NDEP provide additional clarification.

The presentation noted that wells MCF-03A, MCF-28A and MCF-31A appear to have <u>impacts</u> not "inconsistencies". The data shows that well MCF-28A has an elevated level of Radium 226/228 versus the USEPA MCL and is the highest Radium activity in the Deep Zone. Well MCF-31A has elevated manganese concentrations relative to adjacent wells and nearby upgradient wells. MCF-03A has a high concentration of hexavalent chromium and consistently has the highest concentration of a number of analytes versus the rest of the up-gradient wells. These are examples of the types of data exploration that is expected of the Companies. For additional clarification the NDEP has developed Regional Groundwater Goals and Directives and has identified the focus to be the protection of the shallow water bearing zone. Deeper contamination will need

to be evaluated to determine any potential impacts to the shallow water bearing zone at the interface of the zones or through upward gradients.

d. MGA assumed that monitoring wells spaced greater than 150 feet apart could be data gaps. This spacing ignores the site's lithology and specifically the fact that the shallow groundwater flows within alluvial materials and not hard rock. It also ignores the precision with which the horizon between the alluvium and the deeper Muddy Creek Formation has been mapped and specifically the location of the paleo channels incised in the surface of the Muddy Creek Formation. It also ignores the fact that by MGA's own count more than 1,900 wells already exist on the site. Finally, all wells installed in the BMI Common Areas were installed upon specific NDEP approval of workplans and well-spacing was a key consideration. BRC specifically rejects the use of this arbitrary distance as a "data gap."

NDEP is not clear with BRC's use of the term "hard rock" as it is known the both the xMCf and the UMCf are part of the Shallow Zone. The existence of 1,900 wells across the BMI Complex and Common Areas is irrespective to site-specific data gaps. The NDEP approval of any Deliverables is also irrespective of the existence of data gaps. MGA's assumption of 150 feet spacing is based on the current understanding of the dimensions of paleochannels (in that major paleochannels are generally ~150' wide or wider) and the expected radius of influence of wells within the alluvium. As stated; the spacing of groundwater monitoring wells 150 feet apart could be a data gap. Additionally if the selected groundwater remedy for the BRC common areas will focus on the paleochannels, some additional assessment in these areas may be needed to design a final remedy.

e. MGA stated in the presentation that "data in the middle and deep zones is sparse." It also stated that radionuclide data are sparse. To the contrary, the data are abundant for both the deep zone and radionuclides. As stated previously, BRC feels there is no middle zone and so the data for the middle zone may appear "sparse" when in fact like the zone, the data is nonexistent.

Please see the NDEP comment to 2.b

f. As noted above, there was no discussion of data gaps in the up-gradient areas. ***NDEP agrees as this was not part of the scope of work and notes that the up-gradient data gaps will be addressed in the NDEP Regional Groundwater Goals and Directives.***

g. It was stated that it is important to reconcile the cation-anion "balance". This is a familiar issue, but it needs to be properly adapted to the various sites at the Complex given the high salt content of the groundwaters and their heterogeneity. The issue was not clarified at the February 16 meeting, either. We reiterate that the cation-anion balance is not a data gap or a QA/QC issue, nor is one easily resolved by simply changing analytical laboratories, as was suggested at the meeting.

The NDEP has considered all comments submitted related to cation anion balancing and has determined that this is a site specific issue and will not be a portion of the site wide Regional Groundwater agenda at this time. The NDEP encourages each individual company to attempt to resolve this issue independently.

3. Indicator Compounds

BRC has reviewed the analytical framework that the NDEP used in determining contaminants of regional interest and we were pleased to note that the framework is consistent with one used by BRC in selecting indicator contaminants of interest for the Eastside. Thus, this critical step is now complete for the Eastside. In addition, the NDEP made clear that critical decisions such as selection of indicator compounds, etc. would have to be made on a site-by-site basis, regardless of any identification or elimination of contaminants on a regional basis. This further diminishes the utility of a regional effort. We are not aware of any new compounds that have become relevant as a result of the regional analysis, which were otherwise not on a site-specific basis within the BMI Common Areas.

NDEP disagrees that this is a surrogate for the site-specific indicator parameter selection process. Additionally the NDEP notes that we disagree that this step diminishes the importance of regional coordination. NDEP believes that these regional efforts will optimize the sampling and analyses by the Companies, result in cost savings and lead to sound decision making. The NDEP would like to remind BRC that the majority of the groundwater contamination now located on the Common Areas was placed their through conveyance

piping and ditches from the plant sites. The NDEP additionally would like to point out that certain portions of the BRC common areas are directly down-gradient of the plant sites and are impacted by groundwater contamination related to the plant operations.

4. Upgradient Comparisons

BRC reiterated to the NDEP during the meeting on February 17th that it is critical for the NDEP to approve the BRC Upgradient Technical Memo, the only remaining technical document that is currently preventing BRC from completing the RAS/ROD development for the Eastside. BRC was encouraged to hear that NDEP does not see a connection between this approval and the NDEP regional work. However, we have still not received any comments on this even though the memo was submitted to the NDEP on January 11, 2011, over a year ago. Based on our discussions, BRC assumes there are no substantive comments. BRC will provide to the NDEP how the statistical comparison process will work using arsenic as an example analyte. At the same time we will also resubmit to the NDEP the revised Indicator Parameter Tech Memo, for which BRC has received previous NDEP comments. Note that BRC had been waiting for comments on the Upgradient memo before we resubmitted the revised Indicator Parameters Tech Memo.

The NDEP agrees that that the BRC Up-gradient Technical Memo and the Regional Groundwater Up-gradient topic are two separate issues. The NDEP Regional Groundwater Goals and Directives have been developed and include the topic of up-gradient groundwater quality as it relates to the regional RAO's.

5. General Comments

a. We note that the analysis presented by MGA only used limited temporal data (2009-2010) and that a significant portion of the data used was not validated. BRC is mystified that the NDEP would allow use of such limited and unvalidated data in a meaningful way. By contrast, all of BRC's data has been stringently validated for at least the past seven years. Moreover, we are not allowed by the NDEP to use non-validated data for decision-making. Yet, on the basis of only one year of mostly non-validated data, MGA deduced Data Gaps, "Regionally

Significant Constituents," "sparsity" of data, well-spacing, and other important aspects of the groundwaters.

NDEP notes that this meeting and the documentation developed were meant to initiate discussions on regional groundwater and provide preliminary evaluations of these important technical issues. Due to the lack of regional coordination to date, it was impossible for NDEP to utilize fully validated data sets. NDEP agrees that validated data should be used and will suggest that the Companies or NDEP go back to validate these data sets.

b. When asked what was meant by "Regionally Significant Constituents," which same term has (to our knowledge) never been mentioned or defined anywhere in the project's enormous literature, the response was that these are chemicals and elements which, in "McGinley's professional judgment", are important. There was no mention of quantitation or context. As we have noted above, since indicator compounds will need to be developed on a site-by-site basis, the usefulness of this concept is not clear to us.

Please see NDEP response to comment 2.b.

c. We note that the meeting was run more like a working session and less of like an actually presentation of findings. The NDEP's high standards were not met.

The NDEP's purpose for the meeting was meant to seek dialog between All Companies, the NDEP and various representatives. The NDEP appreciates the comment and looks forward to a continued dialog with BRC on this matter.

6. Conclusion

BRC sees no benefit in being part of a regional effort. Apart from the problems noted above which cast serious doubt on the efficacy of the effort, from a time and resources perspective, BRC believes participation would be distracting to and dilutive of its focused and continuing effort to close the BMI Common Areas. BRC does reiterate its position that we move forward expeditiously with regards to finalizing the Upgradient Tech Memo and then onto the development of the RAS and ROD for the Eastside.

The NDEP disagrees with the conclusion given by BRC for the following reasons:

1. *The NDEP understands that a great majority of the groundwater contamination now located on the Common Areas was placed their through conveyance piping and ditches from the plant sites which link the BRC Common Areas back to the plant sites*
2. *Certain portions of the BRC common areas are directly down-gradient of the plant sites and are likely impacted by groundwater contamination related to the plant operations;*
3. *The NDEP Regional Groundwater Goals and Directives will prevent future contaminated groundwater from impacting the BRC property once implemented;*
4. *BRC will be involved with the implementation of the NDEP Regional Groundwater Goals and Directives as they relate to the Corrective Actions Management Unit (CAMU) area, Western Hook/Open Space sub-areas, and the western portion of the Eastside Common Areas where there may be encroachment from plant site plumes.*

OSSM COMMENTS

General Comments

1. The Companies believe that the BMI Database should not become a default general repository of all data generated by the BMI Companies (or others) as the level of effort to maintain such a database would be overwhelming and would require effort into the far distant future. Rather, the OSSM Companies recommend that the purpose of the database be defined for specific decision making which would, in turn, define its size, scope and duration.

NDEP disagrees and notes that the Companies have started utilizing this database as a reference in reports. Additionally the database will be a necessary tool for the NDEP to track the regional groundwater effort going forward as an unbiased party.

2. The OSSM Companies believe the time period of the data entered in the database is not consistent with data gaps identified by NDEP in the February meeting. There is considerable data that has been generated before and after the time period of the data used for the database that are useful for future decision making.

NDEP notes that the regional database contains all data that has been generated and subjected to the NDEP-prescribed level of data validation. Any additional data would need to meet these standards for any useful decision making going forward, the NDEP requests that any data to be added to the database go through the validation process.

For example, the OSSM Companies completed a Downgradient Study in 2006 that included sampling and analysis for a wide range of chemical groups of numerous wells downgradient of the Companies' GWTS. This data could be useful for trend analysis as it extends the useful time period of the data set. Likewise, annual site-wide sampling programs completed by the OSSM Companies and others have been completed in 2011 and will be completed in April of 2012. These programs provide more up-to-date information than the data existing in the BMI Database. The OSSM Companies believe these data sets resolve many of the data gaps listed by the NDEP, at least for the Companies' programs. Our point is that future additional targeted work may not be necessary to resolve various data gap issues as adequate data exists outside of the NDEP's database time period.

NDEP agrees that this data could be very useful, however, it would require validation and incorporation in to the database for ease of use. NDEP believes that this level of site-specific information was more efficiently addressed by the Companies and that is part of the reason that NDEP noted that site-specific evaluations were still needed for this regional effort. NDEP would request that the Companies validate and resubmit any data sets that the Companies believe are useful for incorporation into the regional database. Alternately, these data sets can be identified and NDEP can validate them.

3. The Companies are concerned that the BMI Database may evolve to become the only NDEP accepted source of groundwater chemical information for future site-specific evaluations. This

would create a cumbersome and inefficient arrangement to support future work. Also, the Companies are concerned about the methods and means of the process of continuing to update and maintain the database.
NDEP notes that the maintenance and updating of the regional database has become very efficient and has been built in to the validation reviews. NDEP suggests that the Companies discuss any specific concerns with the NDEP.

Specific BMI Database Comments

The field parameters of pH, DO, ORP, EC have been collected as part of the OSSM Companies' site-wide monitoring program since 2007. These data are currently being provided to NDEP in the site-wide reports in PDF format. If the Companies were required to provide this data to NDEP for use in the BMI Database, it would need to be hand entered into an Excel spreadsheet. **Recommendation:** Instead, if future decision determines there is value to adding these parameters to the database, the OSSM Companies recommend providing pH, DO, ORP data in spreadsheet form for input to the database. The EDD would then be an Excel spreadsheet.

NDEP appreciates these comments and will consider them in the EDD guidance.

OSSM Program Identified Data Gaps

General Comment

1. Regarding data gaps tentatively identified by NDEP for the OSSM program, the Companies believe that over the past 2-3 years, targeted sampling performed as part of the annual site-wide monitoring program have resolved remaining data gaps at the site with the exception of DNAPL (which is currently being addressed directly by Montrose). Each year, the process for developing the scope of the annual monitoring program has been to submit to NDEP a draft monitoring plan for discussion, review and approval. In recent years, that collaboration has led to a successful program that combined a standardized base line of monitoring locations with specific additional sampling to address outstanding data gaps.

NDEP agrees that significant work has been completed and agrees that the Companies should perform a site-specific evaluation of data gaps and provide recommendations to the NDEP. There appears to be a data gap between Warm Springs Road and Boulder Highway which still exists.

2. Over time, that annual process has led to a refinement of the program by installation of a significant number of additional groundwater monitor wells to assess the nature and extent of site related compounds in groundwater and the elimination of data gaps. Furthermore OSSM site data gaps have been evaluated and resolved based on a meeting of the Companies' technical representatives and NDEP on September 27, 2011. The OSSM Companies and NDEP reached resolution, or path forward on each data gap discussed at that meeting. Hence, the Companies feel that the identification of data

gaps suggested by NDEP in the information presented at the All Companies meeting is generally an artifact of the 2009-2010 data set used for the BMI Database rather than a true reflection of remaining data gaps. At this point in time, the primary groundwater related work yet to be done at the OSSM site is the completion of the Groundwater Remedial Action Study and the Companies feel that the site data set is now adequate to support the preparation of that document.

The NDEP's Regional Groundwater Goals and Directives will need to be addressed in the forthcoming Groundwater Remedial Action Study which may identify some additional data gaps. Please refer to the Goals and Directives for additional detail.

Specific Comments

1. Regarding general chemistry and TDS, the OSSM Companies believes that NDEP's suggested development of a special program to assess methods of anion-cation balance is unnecessary for future decisions making. For a complete discussion, please refer to **Attachment A** for a memorandum prepared PES Environmental entitled *"NDEP Recommendations: Shallow Zone Groundwater Analyses Anion-Cation Charge Balances and Total Dissolved Solids (TDS) Olin, Former Stauffer and Former Montrose Facilities Henderson, Nevada."*

The NDEP has considered all comments submitted related to cation anion balancing and has determined that this is a site specific issue and will not be a portion of the site wide Regional Groundwater agenda at this time. The NDEP encourages each individual company to attempt to resolve this issue independently.

2. With respect to the Regionally Significant Constituents list identified by NDEP, the OSSM Companies generally agree with the concept of identifying compounds of regional significance, but note that significant compounds tend to be site-specific as one traverses the BMI site. The OSSM Companies are therefore concerned that arbitrarily defining a set of analytes for monitoring across the BMI site runs a danger of producing a large volume of unnecessary data. Therefore, the OSSM Companies are not in support of establishing a uniform regional analyte list.

NDEP agrees that optimization of the sampling and analyses is of the highest importance; however, having a complete regional understanding is also important. NDEP believes that the analytical suites have been reduced as completely as possible, however, if there are specific refinements that the Companies feel are appropriate, NDEP welcomes the input.

3. Regarding further evaluation of the Middle and Deep zones, the Companies have recently devoted considerable resources to evaluate and report on the Middle and Deep zones at the OSSM Site and in the vicinity of the Groundwater Treatment System (GWTS). Based on those evaluations, the OSSM Companies feel that the assessment of the Middle and Deep zones is complete in these areas and no further data gaps exist to deter future decision making.

The NDEP's Regional Groundwater Goals and Directives will need to be addressed which may identify some additional data gaps that were previously not considered. Please refer to the Goals and Directives for additional detail.

4. Regarding Data Quality Objectives, the OSSM Companies believe that the data quality objectives developed for each BMI site should continue to be used, even if a regional groundwater monitoring program may be developed in the future. The reasoning is the same as discussed above for analytes as objectives vary as one traverses the BMI site. In contrast, the development of regional groundwater data quality objectives appears to be a difficult, time consuming, and costly effort.

NDEP disagrees that regional DQOs should not be developed; however, NDEP does agree that site-specific DQOs are also necessary.

Regional Transect Monitoring

Per Figure 15 of the NDEP presentation, NDEP identified a total of four monitoring well transects that might be used in the future for regional monitoring. While the OSSM Companies generally support the regional transect concept to simplify future monitoring, we are concerned about how the current system of multiple site-specific monitoring programs could be transitioned into regional monitoring and still serve all site-specific purposes. As noted by others in the All Companies meeting, the various BMI Companies have developed monitoring plans as a means to an end, typically supporting their remedial activities that are unique from site to site. On the other hand, regional monitoring appears to be an end in itself, perhaps as an end game to the BMI area program. It is apparent that the individual company programs and the regional transect monitoring concept have many monitoring locations in common, hence perhaps some hybrid of the two could be developed to provide regional as well as site specific monitoring without creating an onerous condition of one program overlying another.

NDEP welcomes specific input from the Companies and will be open to recommendations from all parties during this process.

For example, in the vicinity of the OSSM Site, the suggested upgradient transect would be useful to determine background concentrations and the potential migration of contaminants onto the OSSM Site. Similarly, the suggested transect located in the vicinity of Warms Springs Road would be useful as the point of compliance for the GWTS remedy. The OSSM Companies concur with NDEP that the details of the transect monitoring concept such as the identification of wells, spacing of wells, monitoring funding mechanisms needs to be further discussed.

NDEP welcomes specific input from the Companies and will be open to recommendations from all parties during this process. The NDEP agrees with this comment with the addition of one additional transect at the downgradient physical property boundary.

ATTACHMMENT A
MEMORANDUM

OSSM COMPANIES FEEDBACK REGARDING
NDEP Recommendations: Shallow Zone Groundwater Analyses
Anion-Cation Charge Balances and Total Dissolved Solids (TDS)
Olin, Former Stauffer and Former Montrose Facilities
Henderson, Nevada

This memorandum has been prepared on behalf of Olin Corporation, Stauffer Management Company LLC/Syngenta Crop Protection, LLC and Montrose Chemical Corporation of California and (i.e., "the Companies" as referred to herein) as follow-up to the Nevada Division of Environmental Protection (NDEP) regarding the subject of anion-cation charge balances and TDS analyses as discussed at the February 16, 2012 BMI Complex All Companies Meeting. As part of the NDEP's recommendations to address general chemistry parameters for Shallow Zone groundwater analyses, the NDEP proposed the following items for the Companies consideration:

- "Identify a qualified laboratory;
- Comprehensive round of sampling for cation/anion and TDS data that are valid and usable; and
- If data collection and balances are successful, cation/anion could be reduced or eliminated."

The purpose of this memorandum is to provide the Companies' evaluation and input regarding the above items. The Companies' evaluation of the above items included: (1) review of pertinent research and guidance related to anion-cation charge balance of water quality analyses1, (2) discussions with analytical laboratory directors of the inorganic, wet chemistry departments at Test America Irvine and ALS Environmental, Fort Collins Environmental Lab, and (3) review of general chemistry datasets previously reported for the Companies 2010 and 2011 groundwater monitoring programs. While it is recognized that the NDEP has successfully implemented programs to provide for the accuracy of groundwater samples analyzed at the BMI Complex based upon a number of requirements and procedures, one of these methods, the Cation-Anion Balance2 based upon *Part 1000, Section 1030 E. Checking Correctness of Analyses* of *Standard Methods* (1999), is not routinely applicable for its' intended purpose due to the complex and wide range in chemical characteristics of the non-potable groundwater samples collected and analyzed in the groundwater monitoring programs performed on behalf of the Companies. Moreover, despite the NDEP's efforts to update the Cation-Anion Balance guidance in an attempt to account for such chemical complexities, the Cation-Anion Balance is not appropriate (for reasons described below) for a high percentage of the groundwater samples analyzed from the Companies' monitoring programs.

Background and Principles of Anion-Cation Charge Balance

Standard Methods (1999) describes a number of procedures for checking the correctness of analyses of water samples including the anion-cation balance. *Standard Methods* (1999) states that "The anion and cation sums, when expressed as milliequivalents per liter (meq/l), must balance because all potable waters are electrically neutral." An additional condition of the anion-cation balance check is that it should not be applied to water samples which contain

suspended solids, because the contribution of solid phases to the total charge of the balance would be difficult to quantify. Hem (1970) further elaborates that the difference between the two sums (in meq/l) of cations and anions should generally not exceed 1 or 2 percent "in waters of moderate concentration (250 - 1,000 mg/l)". Moreover, Hem (1970) states: "Water with dissolved-solids concentrations much greater than 1,000 mg/l tends to have large amounts of a few constituents. In such waters, the test of anion-cation balance does not adequately evaluate the accuracy of the values of the lesser constituents. The concept of equivalence of cations to anions is chemically sound, but in some waters it may be difficult to ascertain the forms of some of the ions reported in the analysis. To check the ionic balance, it must be assumed that the water does not contain undetermined species participating in the balance of that formula and charge of all the anions or cations reported in the analysis are known".

Brief Overview of General Chemistry Results for Shallow Zone Groundwater Samples
A cursory review of laboratory analytical results for general chemistry analyses of Shallow Zone groundwater samples reported by the Companies for data from 20103 shows the following chemical characteristics:

- The TDS concentration for 46 samples ranges from 890 milligrams per liter (mg/l) to 45,000 mg/l with a median concentration of 6,800 mg/l;
- The chloride concentration for 46 samples ranges from 190 milligrams per liter (mg/l) to 15,000 mg/l with a median concentration of 1,700 mg/l;
- The sodium concentration for 46 samples ranges from 15 mg/l to 11,000 mg/l with a median concentration of 1,400 mg/l;
- The sulfate concentration for 46 samples ranges from 210 mg/l to 3,400 mg/l with a median concentration of 1,400 mg/l;
- The perchlorate concentration for 46 samples ranges from 0.3 micrograms per liter (ug/l) to 570,000 ug/l with a median concentration of 125 ug/l; and
- The pH for 46 samples ranges from 5.3 to 10.9.

What the above data show (without the necessity of providing a more in-depth summary of the complex geochemistry and other chemical constituents [e.g., other general chemistry parameters, metals, VOCs, SVOCs, OCPs, etc.] present in representative groundwater samples analyzed from the Companies' groundwater monitoring programs), are that the fundamental principles of the anion-cation balance checks as defined in *Standard Methods* (1999) and Hem (1970) are not intended nor appropriate for conducting anion-cation balance checks for the majority of these groundwater samples. In addition to the TDS characteristics alone, several of the individual anions and cations (i.e., sulfate, chloride, sodium, etc.) comprise a high percentage of the charge balance which violates the underlying principle of *Standard Methods* (1999) that "The anion and cation sums, when expressed as milliequivalents per liter (meq/l), must balance because all potable waters are electrically neutral." Unfortunately, when attempting to perform the anion-cation balances of these more concentrated and complex groundwater samples (e.g., when the total concentration of a constituent is sufficiently high to significantly influence the overall negative or positive charge), it is not sufficient to simply apply an additional guideline (e.g., equilibrium calculation) or correction factor in attempt to optimize the accuracy of the anion-cation checks. Although calculation software is available to assist in reducing the uncertainty with respect to some of these issues, more often than not, the process

becomes more of a research project as opposed to the intent of *Standard Methods* (1999). Hence, if the fundamental principles of the anion-cation charge balance are not appropriate for any of the reasons mentioned above, there is little benefit in performing such checks.

Proposed Path Forward

While the Companies do not support the NDEP's proposed "comprehensive round of sampling for cation-anion and TDS data that are valid and usable" (for the reasons cited above), it is the Companies' understanding that one of the NDEP's primary objectives in recommending the cation-anion monitoring program is to ultimately place greater confidence in the analysis and reporting for TDS, with the expectation that "cation-anion monitoring could be reduced or eliminated." To that end, the Companies propose a more straight-forward approach, as summarized below, which is based upon additional laboratory quality control checks for the analysis of groundwater samples for TDS.

The following general procedure is based upon discussions with analytical laboratory directors of the inorganic, wet chemistry departments at Test America Irvine and ALS Environmental, Fort Collins Environmental Lab. Both of these analytical laboratories are certified by the NDEP Bureau of Water Quality Planning for performing this analysis.

- Prepare standard solutions containing 100 mg/l, 1,000 mg/l, 10,000 mg/l and 50,000 mg/l total dissolved solids by dissolving appropriate amounts of sodium chloride in a final volume of four liters of deionized water;
- Submit 200 milliliter portions of these solutions for analysis of TDS at a frequency of about one per 20 batch of samples; and
- Carry the samples through the complete TDS procedure and laboratory analytical and reporting program, and provide as an additional QC component in reporting the results for analysis of groundwater samples for TDS.

By placing greater emphasis on the field and laboratory analytical procedures related to the analysis of groundwater samples for TDS, the Companies believe that they would achieve the NDEP's desired goal in a more streamlined and cost effective approach.

TIMET COMMENTS

The NDEP understands that as TIMET is under new management and new ownership since these comments were written the views of both TIMET and their consultants may have changed as indicated verbally by TIMET. The NDEP provides these RTC based upon the comments as written in March of 2012.

- Metals – Arsenic, Lithium, Cr (Total), Cr (VI), Manganese, Molybdenum, Selenium, Thallium, Uranium, and Vanadium

- Arsenic has background/upgradient issues that are unresolved and this makes defining the boundary for the nature and extent of contamination difficult. For the purposes of this evaluation a value of 50 µg/l was chosen for plume delineation.

NDEP has included data that is in the regional database. NDEP would request that the Companies validate and resubmit any data sets that the Companies believe are useful for incorporation into the regional database. Alternately, these data sets can be identified and NDEP can validate them.

- There appears to be insufficient characterization between the north side of the TIMET facility and wells PC-54 and PC-67. There appears to be some wells in this area that could be utilized.

NDEP appreciates this input and will take this matter into consideration in the future.

- General Chemistry – Perchlorate, Nitrate, TDS
  - If nitrate was added to the locations that currently monitor perchlorate and TDS it appears that coverage would be greatly improved for the purposes of understanding the nature and extent of contamination.
  - All of these compounds have background/upgradient issues that are unresolved and this makes defining the boundary for the nature and extent of contamination difficult.

NDEP has included data that is in the regional database. NDEP would request that the Companies validate and resubmit any data sets that the Companies believe are useful for incorporation into the regional database. Alternately, these data sets can be identified and NDEP can validate them.

For the Middle Zone, there is a limited data set.

NDEP has included data that is in the regional database. NDEP would request that the Companies validate and resubmit any data sets that the Companies believe are useful for incorporation into the regional database. Alternately, these data sets can be identified and NDEP can validate them.

NERT COMMENTS

Data Selection and Analyte Evaluation

1. In the McGinley & Associates, Inc. (MGA) Table 6 *Summary of Current Monitoring Program: Water Levels* only 32 wells are listed as being monitored for water levels by the Trust. Please note that the Trust monitors water levels in approximately 270 wells routinely—on either a quarterly or annual basis. For extraction wells, the frequency of monitoring is monthly. Additionally, the Trust monitors numerous wells screened within the Middle and Deep water bearing zones which appear to have been omitted from Table 6. The Trust brings this to the attention of NDEP and requests clarification on how data were selected and filtered for incorporation into Table 6. It should be noted that the Trust did not perform a complete and thorough review of the information contained within all

of the data comprising MGA's evaluation; however, our general review suggests that the other Tables appear to adequately summarize the Trust's current groundwater monitoring program.

NDEP utilized the most current, NDEP-approved monitoring program data that was available at the time of the evaluation. It is expected that this data may have changed. It is suggested that this matter be discussed in detail moving forward for the development of future Deliverables.

Data Gaps and Monitoring Program Recommendations

1. In the presentation slides, NDEP notes that in addition to pH and electrical conductivity (EC), dissolved oxygen (DO) and oxidation reduction potential (ORP) should be collected and recorded for all wells that are monitored. Although the Trust agrees that DO and ORP are valuable data, particularly for understanding of groundwater redox conditions and evaluation of the fate and transport of organic compounds and metal species, DO and ORP are field-measured parameters that are significantly influenced by the method of purging (e.g., traditional pumping, bailing, or low-flow sampling techniques) as well as the method of measurement. ENVIRON notes that consistent and reliable results for DO and ORP are difficult to achieve without performing low-flow purging using bladder pumps with measurements collected from a flow-through cell with zero headspace. Therefore, requiring the measurement of DO and ORP at every monitoring well may be difficult to achieve without a significant increase in time and resources given that significant changes to existing sampling procedures and equipment would likely be necessary. The Trust recommends that a subset of wells be identified where DO and ORP data are necessary to satisfy specific needs of the regional groundwater plan and where the additional procedures could be readily implemented.

It is NDEP's understanding and expectation that low-flow purging and sampling techniques are being utilized which include flow through cells. Given this, collection of the data noted above should not increase time or costs. Additionally it is anticipated that specific groundwater wells would be identified for this purpose as recommended.

2. In the presentation slides and MGA's memorandum provided following the meeting, numerous data gaps within each of the three water bearing zones were identified by MGA and NDEP, particularly with regard to metals. The Trust generally agrees with the data gaps identified based on the information presented during and following the All Companies meeting and (to the extent such is currently available) requests that additional information be provided as to how NDEP would propose addressing these data gaps at individual sites. For example, would be individual sampling plans be required at each site with identified data gaps and these plans be integrated into existing (or future) site investigation programs?

NDEP will discuss these matters with each of the companies as well as the group moving forward. It is expected that each company will identify data gaps and develop a proposal to address these data gaps.

Transect Monitoring

1. The Trust generally agrees with the proposed regional transect monitoring approach and believes the proposed approach will provide for consistency among the various sites and companies' monitoring programs. In addition, the Trust recognizes the need for additional sampling to understand regional background of certain COPCs and the proposed transect monitoring should provide information critical to future decision-making regarding remedial action objectives and associated remedy selection criteria.

2. MGA has identified specific analytes as regionally significant constituents (RSCs) which include certain VOCs, metals, organochlorine pesticides, and general chemistry parameters (perchlorate, nitrate, and TDS). The methodology used by MGA in identifying RSCs appears to be reasonable and based on well-established technical principles. The Trust notes, however, that the monitoring recommendations indicated that "for each chemical class it is expected that the entire class of chemicals be monitored". The Trust requests clarification from NDEP regarding the meaning of the term "chemical class" within the context of MGA's recommendation, particularly with respect to the metals and general chemistry parameters identified.

For example, if a particular VOC is identified as a RSC, it is expected that the standard suite of VOCs will be analyzed and reported.

3. The Trust believes that the proposed regional approach for groundwater monitoring will integrate most efficiently with the RI/FS process by separating the NERT site into discrete Operable Units addressing: 1) on-site soil and groundwater contamination (On-Site OU), and 2) off-site groundwater contamination (Off-Site OU). This approach will allow for a more manageable RI/FS process whereby many of the currently anticipated future informational needs and data gaps for the regional groundwater plume are addressed (at least in part) by the proposed regional monitoring program, and for Data Quality Objectives (DQOs) to be addressed regionally, rather than on a site-specific basis. Moreover, because the regional groundwater is affected by various other source areas, designation of a separate Off-Site OU would more easily allow for the consideration of such issues in the development of a Conceptual Site Model and Remedial Action Objectives. At the same time, a more focused and site-specific Conceptual Site Model can be developed for the On-Site OU which would appropriately address the NERT site proper as a source area for the regional groundwater contamination.

NDEP appreciates these comments and believes they can be discussed directly with NERT regarding site-specific Deliverables.

STAUFFER-SYNGENTA COMMENTS

Evaluation of Potential Data Gaps Identified by the NDEP

As shown on Plate 1, Shallow Zone groundwater monitoring wells AA-MW-25 and AA-MW-07 are located near the eastern boundary of the site. Well AA-MW-25 is bounded to the east by the following Shallow Zone groundwater monitoring wells: B-04, B-06, M-092, M-123, and M-124. Well AA-MW-07 is located approximately 1,500 feet north (downgradient) of well AA-MW-25. Well AA-MW-07 is bounded to the east by the following Shallow Zone groundwater monitoring wells: M-125, M-126 and M-127.

As shown on Plate 1 and further described below, the spatial distribution of BHC isomers in Shallow Zone groundwater east of wells AA-MW-25 and AA-MW-07 is adequately defined. No additional groundwater monitoring locations appear warranted to address the spatial distribution of BHCs in Shallow Zone groundwater within this area.

It is requested that figures be developed for each of the analytes to support these statements. It is also noted that the wells that are shown to support the Companies statements are greater than 150' away. Please list the distances for each of the wells that are referenced.

1. The most-recent data show that alpha-BHC was detected in groundwater samples from wells AA-MW-25 and AA-MW-07 at concentrations of 1.8 micrograms per liter (µg/L) and 83µg/L, respectively. As summarized in Table 1, alpha-BHC was either not detected (ND) or not detected at concentrations at or above the BCL in groundwater samples from the following Shallow Zone wells located to the east (of wells) AA-MW-25 and AA-MW-07): M-092 (ND at a reporting level less than [<] 0.0047µg/L), M-124 (< 0.094µg/L), M-123 (ND < 0.094µg/L), M-125 (0.11µg/L) and M-126 (ND < 0.049µg/L.

It is requested that figures be developed for each of the analytes to support these statements.

2. The most-recent data show that beta-BHC was reported for groundwater samples from wells AA-MW-25 and AA-MW-07 at a concentration of 0.26µg/L and ND < 0.82µg/L, respectively. As summarized in Table 1, beta-BHC was either ND or not detected at concentrations at or above the BCL in groundwater samples from the following Shallow Zone monitoring wells: M-092 (0.016µg/L), M-124 (ND < 0.094µg/L), M-123 (ND < 0.094µg/L), M-125 (ND < 0.0038µg/L), M-126 (ND < 0.049µg/L) and MW-127 (ND < 0.094µg/L).

It is requested that figures be developed for each of the analytes to support these statements.

3. The most-recent data show that gamma-BHC was reported for groundwater samples from wells AA-MW-25 and AA-MW-07 at a concentration of 1.3µg/L and ND < 0.65µg/L, respectively. As summarized in Table 1, gamma-BHC was either ND or not detected at concentrations at or above the BCL in groundwater samples from the following Shallow Zone monitoring wells: M-092 (ND < 0.094ug/L), M-124 (ND < 0.094µg/L), M-123 (ND < 0.094µg/L), M-125 (0.055µg/L) and M-126 (0.084µg/L).

It is requested that figures be developed for each of the analytes to support these statements.

<u>All Direction in vicinity of PC-31</u>

As shown on Plate 1, Shallow Zone groundwater monitoring well PC-31 is located approximately 3,700 feet downgradient of the GWTS. Other Shallow Zone groundwater monitoring wells located in the vicinity of well PC-31 include: PC-40, H49A, H-56A, H48, MW-R, MW-A-J, MW-K1, PC-50, PC028, and PC-064.

NDEP notes that the distances to each of these wells is greater than the 150' criteria utilized by NDEP. Please list the distances for each of these wells.

As shown on Plate 1 and further described below, the spatial distribution of BHC isomers in Shallow Zone groundwater in the vicinity of well PC-31 is adequately defined. No additional groundwater monitoring locations appear warranted to address the spatial distribution of BHCs in Shallow Zone groundwater within this area.

1. The most-recent data show that alpha-BHC was detected in the groundwater sample from well PC-31 at a concentration of 0.45µg/L. As summarized in Table 1, alpha-BHC was either ND or not detected at concentrations at or above the BCL in groundwater samples from the following Shallow Zone monitoring wells located in the vicinity of well PC-31: PC-040 (3.7µg/L), H49A (0.066µg/L), H-56A (1.0µg/L), H48 (ND < 0.047µg/L), MW-R (0.18µg/L), MW-A-J (0.72µg/L), MW-K1 (0.41µg/L), PC-50 (0.73µg/L), PC-028 (ND < 0.0047µg/L) and PC-064 (0.013µg/L).

2. The most-recent data show that beta-BHC in the groundwater sample from well PC-31 was detected at a concentration of 7.5µg/L. As summarized in Table 1, beta-BHC was either ND or not detected at concentrations at or above the BCL in groundwater samples from the following Shallow Zone monitoring wells located in the vicinity of well PC-31: PC-040 (ND < 0.049µg/L), H49A (ND < 0.047µg/L), H-56A (0.55µg/L), H48 (ND < 0.047µg/L), MW-R (0.95µg/L), MW-A-J (1.6µg/L), PC-50 (0.26µg/L), PC-028 (ND < 0.0094µg/L) and PC-064 (ND < 0.0094µg/L). Although, beta-BHC was detected at a concentration of 4.7µg/L at well MW-K1, the concentrations in Shallow Zone monitoring wells located further downgradient (e.g., ARP-6A, MW-K5, MW-APX-5-16, PC-004, MW-S, MW-U, PC-077, PC-056, PC-086 and PC-097) were either ND or not detected at concentrations at or above the BCL.

3. The most-recent data show that gamma-BHC in the groundwater sample from well PC-31 was reported as ND < 0.094µg/L. As summarized in the Table 1, gamma-BHC was either ND or not detected at concentrations at or above the BCL in groundwater samples from the following Shallow Zone monitoring wells located in the vicinity of well PC-31: H49A (0.074µg/L), H-56A (ND < 0.094µg/L), H48 (ND < 0.047µg/L), MW-R (ND < 0.094µg/L), MW-A-J (ND < 0.094µg/L), MW-K1 (ND < 0.094µg/L), PC-50 (0.10µg/L), PC-028 (ND < 0.094µg/L) and PC-064 (ND < 0.094µg/L).

As noted above, please develop figures to support each of these statements.

<u>North, Northeast, and Northwest of wells MC-48. MC-49, MC09R, MC-50, and MC-114</u>

As shown on Plate 1, Shallow Zone groundwater monitoring wells MC-48, MC-49, MC-09R, MC-50 and MC-114 are located at distances ranging from 250 feet to 700 feet downgradient of the GWTS. Other Shallow Zone groundwater monitoring wells located to the north, northeast and northwest of this area include: H-17R, H-10A, H-50, MC-113, MC-62, H-51, MC-66, MC-65 and MC-53.

As shown on Plate 1 and further described below, the spatial distribution of BHC isomers in Shallow Zone groundwater downgradient of wells MC-48, MC-49, MC09R, MC-50, and MC-114 is adequately defined. No additional groundwater monitoring locations appear warranted to address the spatial distribution of BHCs in Shallow Zone groundwater within this area.

1. The most-recent data show that alpha-BHC was detected in groundwater samples from wells MC-48, MC-49, MC-09R, MC-50 and MC-114 at concentrations ranging from 0.27µg/L (MC-09R) to 2.4µg/L (MC-49). As summarized in Table 1, alpha-BHC was either ND or not detected at concentrations at or above the BCL in groundwater samples from the following Shallow Zone monitoring wells located in this area: H-17R (ND < 0.05µg/L), H-10A (8.2µg/L), MC-113 (1.0µg/L), H-51 (ND < 0.05µg/L), MC-66 (0.086µg/L), MC-65 (0.52µg/L) and MC-53 (0.25µg/L). Although the concentrations of alpha-BHC at wells H-50 and MC-62 were 14µg/L and 11µg/L, respectively, the concentrations at wells located further downgradient (i.e., wells H-49A, H48 and PC-040) were either ND or not detected at concentrations at or above the BCL.

2. The most-recent data show that beta-BHC was detected in groundwater samples from wells MC-48, MC-49, MC-09R, MC-50 and MC-114 at concentrations ranging from 4.0µg/L (MC-114) to 10µg/L (MC-50). As summarized in Table 1, beta-BHC was either ND or not detected at concentrations at or above the BCL in groundwater samples from the following Shallow Zone monitoring wells located in this area: H-17R (0.057µg/L), H-51 (ND < 0.05µg/L), MC-66 (ND < 0.047µg/L), MC-65 (ND < 0.047µg/L) and MC-53 (1.1µg/L). Although the concentrations of alpha-BHC at wells H-10A (16µg/L), H-50 (27µg/L), MC-113 (8.7µg/L) and MC-62 (18µg/L) are above the BCL, the concentrations at Shallow Zone monitoring wells located further downgradient (e.g., H-49A, H48 and PC-040) were either ND or not detected at concentrations at or above the BCL.

4. The most-recent data show that gamma-BHC was detected in groundwater samples from wells MC-48, MC-49, MC-09R, MC-50 and MC-114 range from ND < 0.095µg/L (MC-48 and MC-49) to 0.15µg/L (MC-50). As summarized in Table 1, gamma-BHC was either ND or not detected at concentrations at or above the BCL at the following Shallow Zone monitoring wells located in this area: H-17R (ND < 0.05µg/L), H-10A (ND < 1.0µg/L), H-50 (ND < 0.05µg/L), MC-113 (0.038µg/L), H-51 (ND < 0.05µg/L), MC-66 (0.047µg/L), MC-65 (0.06µg/L) and MC-53 (0.029µg/L). Although the concentrations of gamma-BHC at well MC-62 was 0.95µg/L, the concentrations at Shallow Zone monitoring wells located further downgradient (e.g., MW-R, PC-031, MW-A-J, MW-K1, PC-50 and PC-028) were either ND or not detected at concentrations at or above the BCL.

As noted above, please develop figures to support each of these statements. NDEP notes that the distances to each of these wells appears to be greater than the 150' criteria utilized by NDEP. Please list the distances for each of these wells.

Conclusions of Data Gap Analysis

The evaluation of available information from various groundwater monitoring programs performed throughout the BMI complex show that suitable Shallow Zone groundwater monitoring well locations exist to adequately characterize the spatial distribution of alpha-, beta-, and gamma-BHC isomers in Shallow Zone groundwater within the areas identified by the NDEP as representing potential data gaps. No additional groundwater monitoring locations appear warranted to address the spatial distribution of BHC isomers in Shallow Zone groundwater within the subject areas. It is anticipated that groundwater monitoring for OCPs (including BHC isomers) would continue, at a minimum, in accordance with the annual site wide groundwater monitoring program.

See NDEP comments above.