Freeport-McMoRan Chino Mines Company – Administrative Order on Consent Response to USEPA Region 6 Technical Support Document (USEPA June 2014), Technical Review of Use Attainability Analyses Supporting Amendments to the New Mexico's Standards for Interstate and Intrastate Surface Waters 20.6.4 NMAC

Freeport-McMoRan Chino Mines Company
Smelter Tailings Soils Investigation Unit (STSIU) Drainages
October 2014

This document presents Freeport-McMoRan Chino Mines Company's (Chino) response to comments (RTCs) from the Environmental Protection Agency (USEPA) Region 6 on the Application of the Hydrology Protocol (HP) to Smelter/Tailing Soils Investigation Unit (STSIU) Drainages, as presented in USEPA's Technical Support Document (TSD) (USEPA Region 6, June 2014). The HP report was prepared to support determinations regarding the appropriate hydrologic classification of STSIU surface waters through a Use-Attainability Analysis (UAA) process, as described in section 20.6.4.15 (2) of New Mexico's Administrative Code (NMAC). This letter is organized to present a response to each comment received from EPA Region 6 (reproduced below in **bold text**). Comments and responses are organized by report section (report sections are listed in *italicized text* below).

Summary of the State's Findings and Submission to Region 6

USEPA Region 6 comment: Initial findings in the Chino report concluded that CWA §101(a)(2) uses were attainable in Rustler Canyon and Martin Canyon drainages and their tributaries, and the remaining 5 subwatershed drainages that were assessed.

Chino Response: The USEPA Region 6 comment implies that all reaches evaluated in the May 2013 Chino HP study were determined to be non-ephemeral, which is incorrect. Section 6 of the Chino report states that ephemeral classifications are not proposed for Rustler Canyon, Martin Canyon, and reaches containing springs or Chiricahua Leopard Frog (CLF) critical habitat. However, drainages in five watersheds (Subwatersheds A, B, C, D, and E) are proposed for ephemeral classification (excluding reaches that contain springs or CLF critical habitat).

USEPA Region 6 comment: The Chino report's findings were modified based on input from the SWQB, GWQB and NMDGF. The SWQB concluded based on the Chino report that CWA §101(a)(2) uses could be attained in a number of waters that were initial determined to be ephemeral. These include Rustler Canyon and Martin Canyon drainages and their tributaries, the upper portions of Subwatershed C that includes critical habitat for endangered species in the Bolton Canyon drainage, the southeast tributary of Drainage D1 that contains Brown Spring and the northwest tributary in the upper portion of Subwatershed B that contains Ash Spring.

Chino Response: Contrary to the above comment, Rustler Canyon was initially determined to be non-ephemeral and therefore was never proposed for ephemeral classification. Chino did agree to exclude portions of Subwatersheds B, C, and D that are associated with the CLF critical habitat and/or that contain springs; and to exclude drainages with historic CLF populations such

as Martin Canyon. However, the presence of an isolated spring or the delineation of CLF critical habitat or historic populations does not necessarily preclude an ephemeral designation of a tributary reach because by definition, CLF critical habitat can consist of ephemeral drainage channels (USFWS 2012).

1. Introduction and Background

<u>USEPA Region 6 comment:</u> The Chino report refers to the ongoing mining, enforcement and corrective actions at the mine site, but does not provides a clear explanation of what these actions are, to the point of failing to identify all the acronyms used. This type of information is important to and understanding of the Chino Mines site and should be part of the Chino report, but the lack of detail makes it difficult to understand the activities at the site and if they may or may not affect use attainment in individual waters in the STSIU drainages.

<u>Chino Response:</u> Remedial Action Criteria (RAC) is now defined in the first paragraph of this section in the revised report. A glossary of acronyms and abbreviations has also been added to the Table of Contents of the revised report. Further discussion about the potential for mining and/or remedial activities to affect the natural hydrologic regime of the STSIU drainages evaluated in this study is included in Sections 3 and 4.1.5 of the report. Summaries of mining activities and/or remedial actions that are not relevant to the hydrologic regime of the STSIU drainages have not been included in the revised report.

<u>USEPA Region 6 comment:</u> The Chino report refers to an undated and unreferenced 303(d)/305(b) Integrated Report that suggests Whitewater Creek, the receiving stream for most STSIU drainages is ephemeral. Based on a word search of New Mexico's 2006-2008, 2008-2010, 2010-2012 and 2012-2014 Integrated Reports, no specific reference to the assessment of Whitewater Creek was found.

<u>Chino Response:</u> The above reference to a 303(d)/305(b) Integrated Report that suggests Whitewater Creek is ephemeral has been omitted from the revised report. The intended reference was the Final 2008 - 2010 State of New Mexico CWA 303(d)/305(b) Integrated Report for Hanover Creek (dated August 11, 2008) ("Whitewater Creek to headwaters"), the portion of the Hanover/Whitewater Creek drainage that is upstream of Bayard, New Mexico and adjacent to the northern STSIU boundary, which indicated this drainage section is likely ephemeral. The suggestion that this drainage segment is ephemeral is relevant to the HP study because Hanover Creek is a higher-order stream adjacent to the STSIU study area, indicating that ephemeral determinations for smaller headwater tributaries in STSIU is not inconsistent with knowledge about hydrologic regime of regional streams. Additionally, the USEPA Region 6 recently approved ephemeral classification of San Vicente Arroyo, a neighboring drainage also within the San Vicente basin has been added to Section 3 (Site Setting) of the report (NMED 2013; USEPA Region 6 2013a).

<u>USEPA Region 6 comment:</u> The Chino report also refers to previous site investigations that concluded that the majority of STSIU surface waters are likely ephemeral based on observations of water persistence and lack of aquatic habitat within drainages (NewFields 2006 and NewFields 2007). However, EPA has reported data in its 305(b) Assessed Waterbody History Report (2006) that Whitewater Creek (Mimbres River to headwaters) is perennial. In addition, the United States Fish and Wildlife Service (USFWS) preassessment screen for Chino Mine site describes Whitewater Creek as an intermittent stream; draining both the north and south mine areas (USFWS, 2003).

<u>Chino Response:</u> The Whitewater Creek drainage is not considered part of this STSIU HP study because it is a separate IU (i.e., the Hanover/Whitewater Creek IU) under the Chino Administrative Order on Consent (AOC). The NewFields (2006 and 2007) reference specifically pertains to the STSIU area evaluated in this study and not Hanover/Whitewater Creek IU. For additional background information about this, further description of the various IUs and distinction between Hanover/Whitewater Creek IU and STSIU drainages is provided in Section 3 of the revised report. In addition, reference to observations documented during previous site investigations has been moved from the Introduction (Section 1) to the Site Setting (Section 3) of the report. This study did not assess the Hanover/Whitewater Creek hydrology, and therefore is not proposing any changes to the hydrologic classification to either Hanover or Whitewater Creeks.

<u>USEPA Region 6 comment:</u> The preassessment document also notes that tailings from concentrators at the mine site are deposited in Whitewater Creek. The Chino report does not speak to these tailings or their possible effect on water quality in the STSIU waters although groundwater has been identified as a media of concern at Chino Mines.

<u>Chino Response:</u> Per the Chino response to the previous USEPA Region 6 comment, the reference of the pre-assessment document about tailings from the concentrator being deposited in Whitewater Creek is beyond the scope of the HP study because the hydrology of Whitewater Creek is not assessed in this STSIU HP study. Also, the potential impact of mining activities to surface water quality (including tailing deposition in drainages) is not being assessed in this STSIU UAA study. This UAA specifically assesses whether the natural hydrology limits aquatic life uses in STSIU drainages – not whether water quality impacts limit use-attainment. However, as described in more detail below, potential water quality impacts to aquatic life in STSIU drainages are being addressed under separate site investigations and regulatory programs.

Although the Chino Mines site is not a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (i.e., Superfund) site, the intent of the Chino AOC is to produce CERCLA-like investigations and remedies (NewFields 2006). Therefore, any potential adverse impacts to STSIU water quality associated with mining activities are being addressed under separate regulatory programs and investigations, and are beyond the scope and purpose of this HP study. This study is solely assessing whether the natural hydrologic regime of STSIU drainages may affect aquatic life use attainment.

2. Purpose and Objectives

<u>USEPA Region 6 comment:</u> The Chino report also states that the intent is to support determinations regarding the appropriate hydrologic classification of surface waters through an "expedited" UAA process as described in section §20.6.4.15 (2) NMAC. There is no reference to an "expedited" UAA in §20.6.4.15 (2) NMAC.

<u>Chino Response:</u> The USEPA-approved Statewide Water Quality Management Plan (WQMP) for New Mexico refers to a HP-based UAA as an expedited UAA process for listing waters as ephemeral in 20.6.4.97 NMAC (NMED 2011). This was the basis for using "expedited" in the report. However, the term "expedited" has been omitted from the revised report.

A paragraph describing that hydrology is the 40 CFR 131.10(g) factor assessed for the unclassified STSIU drainages in this study has been added to the *Purpose and Objectives* section of the report (Section 2).

3. Site Setting

<u>USEPA Region 6 comment:</u> The Chino report provides a general regional level description of the STSIU area that broadly touches on climate, topographic relief, tending to focus on soils. It does not provide any details or discussion related individual STSIU drainages themselves and what uses the individual waters may or may not be capable of attaining and why.

<u>Chino Response:</u> This report evaluates whether full aquatic life uses are attainable based on the natural hydrology of STSIU drainages, in accordance with HP guidance. The additions to the *Purpose and Objectives* Section of the revised report, discussed in the above response, include further discussion about hydrology being the 40 CFR 131.10 (g) factor evaluated in this study to assess use-attainment. Observations documented during other investigations (NewFields 2006, 2008; ARCADIS and SRK, 2008) that pertain to the ephemeral nature of the STSIU drainages and corresponding limited aquatic life were added to this section in the revised report, because they provide additional information about the STSIU drainages that is relevant to the uses these drainages may or may not be capable of supporting based on their hydrology.

Additional background information about the different Investigation Units (IUs) at Chino has been added to this section in the revised report to clarify that some areas (including Hanover/Whitewater Creek) are not part of the STSIU and therefore were not assessed in this HP study. Other additions to this section include: a description that livestock grazing is the primary land-use in the STSIU; a summary of the conceptual site model describing historical sources of contamination to the STSIU area (i.e., smelter stack and fugitive dust emissions from mineral processing activities); key reclamation activities conducted to date; and the regulatory processes that are in place to address potential environmental impacts. These additions provide an overview of past mining impacts, regulatory programs and reclamation activities in response to the USEPA Region 6 comment to the *Introduction and Background Section* that this information is useful for review.

<u>USEPA Region 6 Comment:</u> However, this section does refer to the average annual precipitation of 17.5" per year (WRCC, 2004), which reports that most of the rainfall

occurring during the monsoon season of July – September. This annual average rainfall data is of limited value since the Level 1 field evaluations were carried out in June 2011. Summer precipitation during 2011 was the second lowest on record (behind 1980); near the end of June, 48 percent of New Mexico was in exceptional drought, the worst drought category possible (NWS, 2011), which included the area surrounding Chino Mines.

Chino Response: Average annual precipitation amounts and trends (i.e., most precipitation occurs during monsoon season) are relevant to conducting a hydrology-based study. The relatively limited average annual precipitation, most of which occurs during the monsoon season, provides an indication of the arid nature of the area, which in conjunction with the distinct seasonal monsoon precipitation trend, is directly related to the natural hydrologic regime of regional surface waters. Annual potential evaporation estimates referenced by other investigations have been added to this section of the revised report to further demonstrate that annual evaporation exceeds annual precipitation. This is a key characteristic of arid regions in which widespread non-perennial surface waters are common. Precipitation and drought conditions recorded during the time of the HP survey, as well as historical precipitation records, are discussed in more detail in Section 4.1.2 of the revised report.

4. Overview of Study

4.1 Level 1 Office Procedures

USEPA Region 6 Comment: The Chino report indicates that Level 1 reviews rely on evaluations of physical and geographic information about the drainages prior to actual field work. It also notes that many of the reviews of physical and geographic information about the drainages were discussed in the workplan. The exclusion of this type of detail throughout this report is problematic, leaving the reviewer with no clear indication of what decisions were made and why.

Chino Response: Aerial photographs, maps, drainage profiles, and information from previous site investigations were assessed prior to field work to aid in sample reach selection. In addition to discussing this information in the work plan (WP), this information is also presented in the report (aerial photographs and drainage profiles for each subwatershed assessed are listed in Appendices A through G). Revisions now include additional discussion and references to sections of the report that contain these various sources of information.

4.1.1 Sample Reach Selection

USEPA Region 6 Comment: The discussion notes that this physical and geographic information was used with "Site knowledge" to target general sample reaches locations. However, it's unclear what is meant by "Site knowledge" and which, if any actual locations that "might be modified during field evaluations depending on the geomorphic or hydrologic features" were actually modified prior to actual field work. The Chino report again refers to the tentative selection of sample locations prior to field application and possible modification of locations during field evaluations depending on local geomorphic or hydrologic features. The discussion does not clearly indicate if any of the original site selections were actually modified based on these factors. Then it notes the

selection of 21 locations in 12 sub-drainages that were identified for HP application, referring to Table 1. It's unclear if these were "tentative" or actual assessment sites.

Chino Response: The term "Site knowledge" has been revised to "knowledge about geomorphic, hydrologic and mine operation features from local environmental staff at Chino and ARCADIS consultants". Chino worked with NMED SWQB staff to identify a total of 21 sample reaches located in nine subwatersheds in the WP based on the physical and geographic information described in the above response, including previous observations made by ARCADIS staff, Chino staff and NMED staff throughout the STSIU area during previous Site investigations. The HP was applied to all 21 reaches identified in the WP. Three additional reaches were added in the field for a total of 24 locations assessed in this study. Table 1 of the revised report has been updated to reflect the number of HP reaches assessed in the field (note that Chino previously worked with the NMED SWQB in May 2013 to revise this table to show the total number of reaches that were surveyed). Rationale behind adding three additional locations was provided in the HP field forms listed in the appendices; however, this section of the revised report has been updated to include a description of why additional reaches were added during field assessments, which included observations of a channel diversion in Subwatershed B (Appendix B) and observations of pools in drainages in the Rustler Canyon Subwatershed (Appendix G).

4.1.2 Drought Conditions

USEPA Region 6 Comment: The Chino report refers to the 12-month Standardized Precipitation Index (SPI), which can be used as a gauge of drought conditions, noting that drought conditions exist any time the SPI is less than -1.5, indicating severely to extremely dry conditions. The Chino report refers to Figure 1, which shows a 12-month SPI value for the site area during field application of the HP (June 2011) was -1.1, indicating that dry conditions existed during sampling but that conditions were within the SPI range recommended in the SWQB's HP guidance.

However, Figure 1 actually consists of two different graphics, the 12-month SPI (6/1/10 to 5/31/11) map based on "provisional data" and a 72-month SPI graph. Neither of these refer to any of the individual streams being evaluated as required by the SWQB's guidance. The data record for both the map and graph in Figure 1 end before the June 2011 date the HP sampling took place. The 12-month SPI map is small but appears to show the Chino Mine site to be in the 0.0 to -1.0, and possibly within -1.0 to -1.5. It is unclear how a precise reading of -1.1 could be drawn from this map alone. The 72-month SPI graph indicates a downward trend from just below 0.0 into the negative range near the end of the record but does not approach an SPI of -1.1.

Chino Response: The revised report contains the appropriate documentation for the referenced SPI information. The two graphics presented in Figure 1 contain SPI data from two sources, as described below and in the revised report.

The regional 12-month SPI map was obtained from the National Drought Mitigation Center (NDMC) website (http://drought.unl.edu/MonitoringTools/DailyGriddedSPI.aspx). In the revised report, the map presented in Figure 1 has been updated to show the location of Chino within Grant County, New Mexico (indicated as "Site Location", with an arrow pointing to a small box inside Grant County. Based on this map, the 12-month SPI was between 0 and -1.0, which is within the range recommended in the HP guidance for conducting Level 1 field evaluations.

The second graph presented in Figure 1 was obtained from the Western Regional Climate Center (WRCC) website (http://www.wrcc.dri.edu/cgi-bin/spiFmap.pl?spi12) and shows the SPI values versus time. As described in the revised report, a specific 12-month SPI score of -1.1 was obtained by accessing the WRCC website, selecting the climate division that includes the Chino Mines site (i.e., the Southwestern Mountains Division, New Mexico, Climate Division 04), and selecting the "tabular data" option associated with the graph of SPI values versus time. This additional evaluation of SPI conditions was conducted before the Level 1 field evaluations to confirm that severe drought conditions were not occurring and that conditions were appropriate for applying the HP. The two sources of 12-month SPI conditions confirmed this. As an additional indication of long-term drought conditions, the revised report describes that the NDMC 12-month SPI score was less than -1.5 for only one 12-month period (6/1/2005 – 5/31/2006) during the past 9 years (i.e., since 2003, which is the earliest 12-month SPI record available from NDMC at the time of this revised report). Figures 1a through 1i of this RTC document presents the NDMC 12-month SPI maps for this 9-year period. This finding provides an indication that longer-term drought conditions did not persist for the near decade period preceding this study, which is consistent with the NMED (2013) finding of long-term drought conditions assessed for the San Vicente Arroyo HP UAA approved by USEPA Region 6.

The USEPA Region 6 comment suggests that a 12-month SPI value for a specific STSIU drainage is required by the HP guidance. However, this would require that precipitation and snowpack data be recorded at a specific STSIU drainage because as noted in the HP guidance, "SPI calculation… is based on 10 climate regions of New Mexico and long-term precipitation records (both rainfall and snowpack)." These data, however, are not available for the specific STSIU drainages. Furthermore, to Chino's knowledge, none of the HP-based UAAs conducted by the SWQB and approved by USEPA Region 6 (http://www.nmenv.state.nm.us/swqb/UAA/index.html) incorporated a stream-specific 12-month SPI value. Instead, the approved HP-based UAAs appear to have similarly used 12-month SPI values for the region containing the assessed streams (see discussion in the following paragraph). The Chino report includes precipitation data from the nearest gage to the Chino Mines Site, discussed in more detail below, and is consistent with the results of the SPI.

In the Chino HP study, the SPI was applied for the 12-month period before the application of the HP field procedure during June 12 to 15, 2011 (i.e., June 1, 2010 to May 31, 2011). The above comment notes that the map and the graph in Figure 1 end before June 2011, when the HP sampling occurred. However, Chino believes that it is appropriate to use the 12-month period immediately preceding field evaluations instead of using a 12-month period that would include additional days past when the HP study was performed. This approach is also consistent with other HP-based UAAs recently approved by USEPA Region 6. For example, the HP-based UAAs applied to Aqua Chiquita, Grindstone Creek, San Andres Canyon, and San Vicente Arroyo by NMED SWQB (NMED 2013) and approved by USEPA Region 6 (USEPA Region 6, 2013a) utilized the 12-month period immediately preceding field evaluations for the 12-month SPI statistic. In addition, it also appears that HP-UAAs conducted for unclassified non-perennial watercourses with NPDES permitted facilities (NMED 2012) and approved by USEPA Region 6 (USEPA Region 6, 2013b) utilized the 12-month period immediately preceding field evaluations for the 12-month SPI statistic. Furthermore, the NMED (2013) HP study also used NDMC 12-month SPI maps to assess drought conditions, as was done in the Chino HP study (discussed in the second paragraph of this response to USEPA Region 6 comment).

<u>USEPA Region 6 Comment</u>: The Chino report also includes a link to the National Oceanographic and Atmospheric Administration (NOAA) 24-month SPI map, running from May 2011 to April 2013. This map also appears to indicate a discrepancy with the reported -1.1 value. While the scale makes it difficult to see, it appears that for the 24-month time frame specified, the SPI was either in the range of -0.80 to -1.29 or extremely dry at -1.99 to -1.60 for the area around Chino Mines. Again, even if the Chino Mine falls in the area that was in the range of -0.80 to -1.29, it's unclear how a specific value of -1.1 was derived.

<u>Chino Response</u>: The NOAA link was provided in the report as the citation for the SPI definition: The SPI is "an index based on the probability of recording a given amount of precipitation, and the probabilities are standardized so that an index of zero indicates the median precipitation amount". To clarify this, quotation marks have been added to the revised report as well as an indication that this SPI definition was cited from the NOAA link. As noted in the above comment, the SPI maps listed on the NOAA link include data from May 2011 to April 2013, which is nearly 2 years after the HP study. Therefore, interpretation of SPI conditions from these maps is inappropriate for assessing drought conditions during the time of the HP field evaluations (June 2011).

<u>USEPA Region 6 Comment</u>: Because of the possibility of misreading the graphics in Figure 1, particularly the SPI map, a quick search yielded Palmer Z Index Short-Term Conditions for June 2011 (NOAA). The time frame for this NOAA map coincides with the HP sampling. However, it shows that the area around Chino Mines was either in severe, -2.0 to -2.74 or possibly extreme drought at -2.75 and below. Taken together, the SPI and Palmer Z Index data suggest that the area including Chino Mines may have been in drought conditions, potentially well outside of SPI range recommended in the SWQB's HP guidance, meaning that the conclusions based on Level 1 sampling may not be reliable.

<u>Chino Response:</u> Clarification provided above about the 12-month SPI conditions clearly shows that drought conditions were acceptable for applying the HP, based on the specific recommendation about drought-index acceptability in the NMED HP guidance. Chino disagrees with the suggested use of other drought indices that are beyond the NMED HP recommendations.

4.1.3 Precipitation

<u>USEPA Region 6 Comment:</u> In the preceding section, the Chino report refers to long-term historic precipitation data (Figure 2) from the nearby Fort Bayard climatic station. The Chino report indicates greater than average precipitation during the assessment period and that these conditions were representative of the general precipitation conditions. It also noted that precipitation and flow regime observations made at the time of the HP assessment in 2011 were at least representative of the general precipitation conditions observed over the last century, and possibly reflective of wetter conditions. Given that the data reported in Figure 2 ends in 2008 and no data around the June 2011 time frame

of the HP evaluations were reported, the conclusion that general precipitation conditions were at least representative as those observed over the last century are not substantiated.

Chino Response: Figure 2 of the Report included precipitation data from 1900 through 2010. This figure was developed in response to a NMED comment (by letter dated April 30, 2012), and it was intended to provide historical perspective of the precipitation conditions over the last century in comparison to the recent precipitation trends that led up to the completion of the field work supporting the development of the HP. As a result of the number of years summarized in the figure, the x-axis of the graph was labeled 2008 while the last data points shown were from 2009 and 2010 (i.e., there are two data points to the right of the gridline labeled 2008).

Figure 2 has been revised in response to the USEPA Region 6 comment. Data collected from the Fort Bayard climatic station ended in April 2010, approximately a month and a half before the field surveys were completed. The data collected from January through April 2011 has been included in the revised Figure 2. Additionally, the precipitation summation period was modified from the summation of the calendar year precipitation to the summation of the precipitation from June 1 through May 31, which was the period for the SPI calculation utilized to assess a potential drought condition before the field surveys.

Figure 2 shows that the precipitation totals for the 12-month period before the field work (13.7 inches[1]) was slightly less than the average annual precipitation of 16.0 inches measured at the Fort Bayard climatic station over the period of record. However, the total precipitation from the 12-months before the field survey were not anomalous and would not be representative of what may be considered historically low levels of precipitation. For example, of the 111 years of data assessed, 9 years (8%) had annual precipitation totals less than 10.0 inches, and 39 (35%) years had precipitation totals less than the 13.7 inches recorded for the 12-month period before the field surveys. Thus, the precipitation from the Fort Bayard data support the SPI index results that conditions were drier than normal, but the conditions were not representative of more extreme years of drought observed during the preceding 110 years of data.

It may also be appropriate to consider a period greater than 12 months in the assessment of stream base-flow conditions. This multi-year perspective of precipitation data is not necessarily relevant to the analysis of a drought, which principally affects vegetation and peak stream flows; but review of multiple years of data may be relevant to assessing the groundwater conditions that were contributing to stream base-flows of the area during the field surveys. Base flows are groundwater driven and impacted by precipitation; but due to groundwater storage capacity, groundwater elevations and thus stream base flows will tend to have a response lag and will diminish in response to multiple years of drought rather than necessarily an individual year. For the period of greater than 5 years before the field surveys, the 3-year moving average of the

[1] It should be noted that the 12-month precipitation total used for the period preceding the field survey conservatively assumes that there was no precipitation during the month of May (i.e., 0.0 inches was used in the calculation).

precipitation totals indicates generally greater precipitation than the average conditions over the previous century. Therefore, it is reasonable to conclude that the groundwater conditions potentially contributing to base flow of the assessed streams was at least representative of the general conditions over the last century and possibly wetter.

4.1.4 Flow Gages

<u>USEPA Region 6 Comment:</u> The Chino report indicates that historical and recent flow data came from a single regional United States Geologic Survey (USGS) flow gauge located on the Mimbres River, approximately 20 km – approximately 12.4 miles northeast of the STSIU watersheds. The location and proximity of the USGS gauge station to the STSIU waters is important to note. The STSIU drainages C, D and E generally flow in a southerly direction to the Hanover-Whitewater Creek watersheds. Rustler Canyon and Martin Canyon drainages flow southeasterly before their confluence with the upper end of Lampbright Draw, which flows south/southwesterly, eventually to the Mimbres River (Figure 4).

In its Upper Mimbres Water Master District, Water Master Field Manual (March 2006), the New Mexico Office of the State Engineer (NMOSE) describes the Mimbres River Stream System as formed by the snow pack and runoff from 184 square miles of watershed to the northeast (of the gauge), running through part of Grant County into Luna County where it ends. The Manual states that the Mimbres River has one gauging station, USGS gauge 08477110, located between the Kenly #2 and the Heuchling #1 ditches and that there are nine ditches upstream of this gauging station. The physical location northeast of the Chino Mine site and the affect these ditches may have on the measured flow in this portion of the Mimbres raises significant the questions of the validity of using flow data from this USGS gauge station in determining the conditions and use attainment in these waters.

<u>Chino Response:</u> The USGS Mimbres River gauging station (USGS gauge 08477110) does not receive flow directly from the STSIU drainages; however, as indicated in the comment, there are no other gauging stations located within the Mimbres watershed. It should be noted that as a result of the desert environment of the area, the Mimbres River watershed is a naturally dry basin regardless of anthropogenic influences, and Mimbres flow has historically ceased upstream of what is now the Town of Deming.

It would be inappropriate to relate specific flows and flow patterns between the gauging station and the STSIU drainages. But considering the geographic proximity of the gauging station to the STSIU study area (approximately 12 miles), it may be appropriate to use the flow data as a secondary source for indication of potential drought conditions to assess the validity of the primary drought metric of the 12-month SPI as required by NMED. Although micro-climates are a predominant weather condition in the area resulting in isolated areas of precipitation, the close proximity of the gauging station to the STSIU drainages provides a general indication of the

overall climatic and hydrologic conditions in the region. In general, years of increased precipitation observed at the Fort Bayard climatic station and higher SPIs correlate to increased stream flows and vice versa.

Stream diversions and return flows from and to the Mimbres River may have an impact on the flows recorded at the gauging station (daily records exist from 1978 to present), but considering the lack of other available flow data records it remains valid to consider the data in the assessment of general hydrologic conditions of the area and validation of the SPI. Stream flows of less than 1 cfs, considerably less than the flows observed during the HP survey, occurred in 1978, 1979, 1980, 1981, 1982, 1990, 1994, 2000, 2002, 2004, and 2006. These reduced flows also correspond to periods of lower than average precipitation, indicating that there is a response between stream flow and regional precipitation regardless of withdrawals or inputs to the Mimbres. The Mimbres River is also outside the influence of the Chino mine, as indicated by the open pit capture zone (OPCZ) and the greater than 4-miles distance from the limits of the OPCZ and the river. Additionally all tributaries that contribute to flow to the gauging station are outside of the delineated OPCZ influence.

The relationship between precipitation and stream flow, especially base flows, is an indication of drought, but the groundwater storage capacity for precipitation may impact stream flows for several years. Thus there is a lag between periods of reduced precipitation and when a reduced stream base flow may be observed. Likewise, stream base flows may be stable or increase for several years following extended periods of increased precipitation, as excess groundwater storage is slowly released to surface waters during base flow. Review of regional stream flow data, when available, is therefore a reasonable approach for assessing the predominant regional groundwater conditions affecting stream hydrology that may not necessarily be reflected in precipitation and drought indices alone. It is notable that although the 12-month SPI for the period immediately before the field survey indicated slightly drier than normal precipitation conditions, the 2 years prior were wetter than normal, which may have had a continuing influence on base flows.

The flow data reviewed for the Mimbres gauging station support the conclusion from the 12-month SPI that the region was experiencing drier than normal conditions over the year before the field survey, but the conditions were within a normal range and not indicative of a severe annual or sustained drought that would significantly impact stream base flow conditions during the field survey.

4.1.5 Mine Influence on Hydrologic Regimes

Mine Pit Groundwater Influence

<u>USEPA Region 6 Comments</u>: This subsection refers to the delineation of the Santa Rita pit groundwater capture zone as part of the Site-Wide Stage 1 Abatement Final Investigation Report (Golder 2008) and Figure 4. The Chino report states that Rustler

Canyon is the only STSIU subwatershed that could be influenced by the pit groundwater capture. The Chino report also states that delineating the pit capture zone provides evidence that the hydrology of the drainages outside of Rustler Canyon are not impacted by mining activities because the Santa Rita pit represents the only source of potential historical mining impacts that could have affected the natural STSIU hydrology. The Chino report states but does not explain what evidence the delineation of the pit capture zone provides to show that the hydrology of the drainages outside of Rustler Canyon are not impacted by mining activities.

Chino Response: The nature and extent of the shallow groundwater system and the deep regional aquifer associated with the OPCZ, and the direction of groundwater flow around the Santa Rita Pit have been studied extensively to support closure planning and reclamation activities at Chino Mines Site, under Discharge Permit 1340. A comprehensive description of the OPCZ and hydrogeology of the site is beyond the scope of the HP study; however, the key concepts of the groundwater system conceptual model and the approach used to model the OPCZ are summarized below, based on information provided in previous groundwater studies (Golder 2005, Birch et al 2006, Golder 2007, Golder 2008). Chino believes that additional information provided about the OPCZ associated with the deep regional aquifer and shallow groundwater system provides necessary evidence to show that hydrology of the STSIU drainages proposed for ephemeral classification is not impacted by mining activities, when considered in the context of the lack of other potential mining activities that could affect these drainages.

The OPCZ is defined as the area over which groundwater recharged from the land surface flows toward and discharges into the pit; groundwater within the OPCZ is contained and used for process water supply purposes (Golder 2007). A combination of groundwater flow modeling results and empirical groundwater elevation data from more than 150 wells was used to calibrate the model and delineate the OPCZ. As described by Birch et al (2006), a steady-state model was constructed to represent the groundwater system because of the relatively constant water level elevations in most of the wells (i.e., seasonal fluctuations of groundwater elevation data were generally no more than a few meters).

The model was developed using an upgraded version of Modflow software (Modflow-Surfact) and the model was calibrated according to American Society for Testing and Materials (ASTM) guidelines. Groundwater elevation data from more than 150 wells were used in the calibration. The area modeled centers around the Santa Rita Pit (Chino Mines), but extends a sufficient distance away from the pit to determine the lateral extent that groundwater is no longer influenced by the pit drawdown. In total, the numerical model covers a large region around the mine totaling 95 mi^2. For context, the current diameter of the pit is approximately 2 miles (Birch et al 2006). Figure 2-1 from Golder (2005), attached to this document, shows the geographic area modeled to develop the OPCZ.

Calibration and sensitivity analyses were conducted to assure accurate delineation of the OPCZ. Model calibration was accomplished by adjusting hydraulic conductivity and other model input parameters until a reasonable match was obtained between the model-calculated and the

observed groundwater elevations. Calibration was evaluated by the overall shape of the groundwater-elevation contours, the match of the simulated hydraulic heads to observed hydraulic heads at the calibration targets, and model-calculated water budget components (Golder 2005). Consistent with standard practice, calibration error was evaluated by three common methods: the mean error (ME), the mean absolute error (MAE), and the root mean squared error between the measured and simulated water levels (Anderson and Woessner 1992 as cited in Golder 2005). Table 8-3 from Golder (2005) lists the observed and computed water-elevation data for the 152 wells used for model calibration as well as the calibration statistics results. Figure 8-2 from Golder (2005) is also attached to this document to graphically depict the relationship between observed and simulated water elevations. Based on the calibration and sensitivity analyses, some of the key conclusions about the groundwater model as listed by Golder (2005), included:

- Calibrated model parameters are consistent with expected values based on field measurements and professional judgment;
- A reasonably good match was obtained between simulated and observed values of hydraulic head at the calibration targets; and
- The overall expressions of water-depth contours in the model are consistent with the internal hydraulic boundaries of divides, topographic highs and lows, and the pit.

In addition to the OPCZ model, empirical groundwater-elevation data are available from wells surrounding the pit. Importantly, the groundwater-elevation data provide empirical evidence of the extent of the pit drawdown and the direction of groundwater flow. Figure 7-1 from Golder (2008) is provided as an attachment to this document, which shows groundwater-elevation contours, direction of groundwater flow, and groundwater elevation-data from local wells. Based on the groundwater-elevation data presented in the attached Figure 7-1 (Golder 2008), groundwater elevations south of the OPCZ (towards the STSIU drainages) are at a lower elevation than groundwater levels to the north of the OPCZ boundary.

Separate and distinct from the deeper regional aquifer and the associated OPCZ is the shallow groundwater flow system, which overlays the deeper system. This shallow system is observed in the STSIU drainages including Rustler Canyon, Martin Canyon, the upper reaches of Lampbright Draw as well as the C and D series drainages. Shallow groundwater flow in this area is dominated by local, small groundwater flow systems that coincide with the local surface watersheds. Within these surface watersheds, groundwater recharges along the upland margins (ridges), and discharges to the local drainages. In effect, they function as independent hydrologic cells, or independent hydrologic systems where all of the recharge remains within the cells, discharging only to the respective drainages and in the downstream direction. The dominance of local shallow groundwater flow systems is clearly demonstrated by the numerous monitoring wells outside of the OPCZ. Groundwater elevations measured in the monitoring wells show that groundwater elevations are highest beneath the local ridges and lowest along the local drainages. In addition, strong vertical upward hydraulic gradients exist beneath the drainages (e.g., Tributaries 1 and 2, Santa Rita Creek, Hanover Creek and Whitewater Creek),

demonstrating that the drainages serve as groundwater discharge areas for the local shallow groundwater flow systems.

Modeled shallow groundwater contours at distance from the pit from Golder (2008) closely mirror the surface topography of local watersheds and indicate that the groundwater divides between the localized shallow groundwater flow systems remain closely aligned with boundaries of the surface watersheds, as shown on Figure 5 of the revised report. The modeled groundwater velocity vectors shown on Figure 5 (from Golder 2008) indicate the direction of shallow groundwater flow and demonstrate that at these distances from the pit, shallow groundwater is unaffected by the pit and is still dominated by local recharge and discharge systems that coincide with the local surface watersheds. Consequently, the groundwater balance of the subject watersheds are shown by the modeling results to be unaffected by the open pit.

As noted in the Chino HP report, Rustler Canyon and Martin Canyon (the STSIU subwatersheds closest to the Santa Rita Pit) are not proposed for ephemeral classification. Additionally, Lucky Bill Canyon (the subwatershed located southwest of the pit) was not evaluated in this study and therefore is not proposed for a hydrologic classification. The STSIU drainages proposed for ephemeral classification in this study are approximately 2 miles (Subwatershed D) to approximately 5 miles (Subwatershed E) away from the southern OPCZ boundary, and are separated from the OPCZ by multiple topographic and hydrologic divides. As described above and by Golder (2007), outside of the OPCZ, groundwater flow conforms to the surface topography in this mountainous region, which consists of bedrock typified by low hydraulic conductivity. As a result, groundwater in this area is recharged along the ridges and flows towards areas of lower elevation.

For further reference, maps depicting groundwater flow directions from Golder (2007) are attached to this document (Figures 6-1, 7-1, and 8-1 from Golder 2007). Additionally, Figure 7-1 from Golder (2005) depicts surface-water and groundwater divides. Of note, the STSIU Subwatersheds A, B, C, D and E that are proposed for ephemeral classifications are separated hydrologically from the pit area, and therefore are not impacted by pit drawdown (or by potentially impacted groundwater).

<u>USEPA Region 6 Comment:</u> The drawdown of groundwater and its discharge to Whitewater Creek is not the only concern that should be addressed here. The Final Groundwater Restoration Plan for the Chino, Cobre, and Tyrone Mine Facilities (2012) states that hazardous substances from sources at mine sites can be transported to groundwater from infiltration of contaminated surface runoff; seepage from the walls of open pits and underground workings, waste rock, stockpiles, tailings, leach piles, stormwater, or process water reservoirs can injure groundwater. Injured groundwater can then expose downgradient biologic, geologic, and surface water resources to impacts. The Plan also reports that the areal extent of injured alluvial and regional groundwater covers 13,935 acres. Figure 3.2 of the Plan shows the areal extent of injured

alluvial and regional groundwater at the Chino Mine, which overlaps/is larger than the area delineated for the pit capture zone, suggesting that Rustler Canyon may not be the only drainage affected by the Santa Rita pit and leachate from surrounding stockpiles. Although this Chino report is not recommending a re-classification for the Rustler Canyon drainages, the state is obligated to not only ensure that the appropriate designated uses and criteria are in place for these waters, but to ensure that its water quality standards provide for the attainment and maintenance of downstream waters consistent with 40 CFR 131.10(b). In this instance, it means showing that water quality in the Rustler Canyon or other drainages are not affected by the Santa Rita Pits and that anything moving through these drainages is not affecting Subwatershed G drainages and Lamplighter Draw downstream.

Chino Response: As stated previously, the focus of this HP study is on the hydrology of STSIU drainages, not potential impacts to surface or groundwater quality. Those potential water quality impacts are being addressed under separate regulatory and enforcement programs, including CERCLA-type investigations described above.

This HP study is not proposing changes to designated uses of Rustler Canyon, Lampbright Draw, Subwatershed G drainages, or any waters downstream of the STSIU drainages. Again, potential impacts to water quality in these drainages, as well as the STSIU drainages proposed for ephemeral classification in this study, are being evaluated through other regulatory and enforcement programs, not this HP-UAA study. However, determining what uses are attainable in the STSIU drainages based on the natural hydrologic condition of these drainages ensures appropriate water quality criteria are used for ongoing regulatory programs.

The conceptual site model developed for STSIU by SRK (2008) identified historic smelter stack and fugitive dust emissions from historical mineral processing activities and the tailings areas as the primary potential sources of contamination to STSIU. Re-expression of potentially impacted subsurface alluvial water is a secondary source of contamination to STSIU surface water (ARCADIS 2011). However, regional groundwater expression to STSIU drainages has not been identified as a source of contamination to STSIU drainages.

Regional Springs

USEPA Region 6 Comment: **The Chino report states that both recent observations and historical references don't indicate that mining activities have influenced the presence or disappearance of springs in the STSIU drainages. The discussion refers to present and historical observations of Brown Spring, Bolton Spring and Ash Spring specifically – although Figure 4 only shows the location of Brown Spring. There is no indication that the "recent" or "present" observations were made during the 2011 time frame for this UAA or in other unrelated investigations. Although the "historical" observations may refer to dated findings by Paige (1916) and findings by Sivinski and Tonne (2011), there is no discussion of flow volume from these springs other than that they continue to express water and no mention of water quality. There has not been anything presented that clearly supports the conclusion that the flow in these springs has not been impacted**

by mining activities. Although annually-reoccurring pools in Martin Canyon and Rustler Canyon may indicate the presence of seeps or springs, with no data showing consistency in volume or water quality, there is no support for the statement that these seeps or springs have not been impacted by mining activities.

In addition, it's unclear why the springs referenced by Sivinski and Tonne (2011); Apache Tejo Spring, Cold Spring, Kennecott Warm Spring, and Kennecott Cold Spring are mentioned and included in Figure 4 since they are not considered within STSIU drainages that were assessed in this HP study.

Chino Response: As stated in Section 6 and shown on Figure 4 of the HP report, STSIU tributaries containing the referenced springs are excluded from ephemeral classifications, and therefore do not require further evaluation of flow rates in this HP study.

The finding that groundwater in Subwatersheds B, C, and D (i.e., subwatersehds containing Ash Spring, Bolton Spring, and Brown Spring) is unaffected by the pit drawdown described in response to the above USEPA Region 6 comment provides a reasonable and appropriate basis to conclude that flow in these springs has not been impacted by mining activities. Drainages containing these springs have not been developed or modified from their natural condition, and no wells or other mining related influences are located in the vicinity of these springs or within the respective drainage basins to impact their natural flow and persistence.

The locations of Ash Spring and Bolton Spring were shown on the original Figure 4 as green and yellow triangles associated with the CLF critical habitat transect (the labels for these springs were contained in the Figure legend). In the revised Figure 4, the symbols have been modified to blue circles for springs within the STSIU and blue squares for springs outside of the STSIU, with labels displayed on the map for all springs.

References to springs described by Paige (1916) and Sivinski and Tonne (2011) were incorporated into the Chino HP report in response to SWQB comments (by letter dated April 30, 2012). However, those springs outside of the STSIU study area are now distinguished as blue squares in the revised Figure 4.

4.2 Level 1 Field Evaluations

USEPA Region 6 Comment: **This paragraph indicates that the field crew performed one field replicate at pre-determined reach locations as described in the project work plan and consistent with recommendations in NMED SWQB's Quality Assurance Project Plan (QAPP). It also states that three reaches not identified in the workplan were selected in the field to capture localized watershed features. However, the report does not identify these reaches or explain what these features were and why there was need to deviate from the work plan and/or QAPP.**

Chino Response: Information about the field replicate applied at reach D1-2 is provided in Section 5.1.3 (Quality Control).

Additional details about the three reaches not identified in the WP that were selected in the field to capture localized watershed features were added to Section 4.1.1 of the revised report because that section refers to the total number of reaches evaluated in the study.

4.2.1 Sample Reach Selection

USEPA Region 6 Comment: **This subparagraph primarily repeats hydrology protocol requirements, but does say that most sites that were selected were representative of the corresponding drainages. It's unclear if this means that those identified in the previous paragraph are being referred to here.**

Chino Response: Slight revisions were made to the second paragraph of this section to clarify the number of pre-determined reaches and that three additional locations (one in Subwatershed B and two in Rustler Canyon) were added in the field based on observations described in Section 4.1.1.

5. Results

5.1 Summary of Level 1 Field Evaluation Scoring

USEPA Region 6 Comment: This subsection provides a general summary of the results of the Level 1 evaluations indicating that all of the waters evaluated scored as ephemeral, but provides no details with the exception of the discussion of the intermittent finding for Rustler Canyon.

Chino Response: As stated in the report, details associated with the Level 1 Field Evaluation Scoring are summarized in Table 2, and are provided in Appendices A through G, which include the HP Cover Sheets, the HP field forms, aerial photographs, and photo-documentation for the drainages evaluated. Additionally, because the majority of ephemeral reaches were scored as ephemeral after evaluating the first six HP indicators, the subsequent subsections in the report provide discussions of those indicators, as observed throughout STSIU drainages.

5.1.1 Sub-Watershed Drainages Scored as Ephemeral during Level 1 Field Evaluations

USEPA Region 6 Comment: This paragraph notes that during field application of the HP, an ephemeral classification was reached for most of the drainages after scoring the first 6 indicators. The discussion notes that of the 24 reaches evaluated, 17 reaches were determined as ephemeral after the first six indicators were evaluated and scored, and that three additional reaches were determined as ephemeral based on evaluation and scoring of all Level 1 HP indicators.

USEPA Region 6 Comment: See comments provided under section 4.1 Level 1 Office Procedures and its subsections.

Chino Response: See Chino responses provided under Section 4.1 Level 1 Office Procedures and its subsections.

6. Conclusions and Hydrologic Classification Recommendations

<u>USEPA Region 6 Comment:</u> The report states that the ephemeral classifications for the remaining waters are based on Level 1 hydrology determinations consistent with "observations and suggestions from previous Site investigations." In referring to Figure 4, this section also states that the ephemeral designation for the identified STSIU drainages also applies to their associated tributaries because the unnamed reaches assessed during the HP study were "determined to be representative of the collective subwatershed." The basis for this presumption is unclear since there were no sampling sites in these tributaries. This is of particular concern since waters and tributaries in Rustler Canyon, Martin Canyon, drainage C-4 and C-19 were initially determined to be ephemeral but were later found to have flow present after further investigation prompted by NMED. A defensible UAA relies on current findings, not "suggestions" from previous site investigations.

<u>Chino Response</u>: As described in the HP report (but not referenced in the above comment), primary drainage channels were assessed in each subwatershed. The hydrologic conditions observed in these primary drainage channels provides a strong indication of hydrologic conditions of lower order, hydrologically-connected tributary drainages that have the same or less flow persistence as the downgradient primary drainage channel given the absence of springs in those tributary drainages. All tributaries containing springs were excluded from ephemeral classification in this study. Referring to the yellow ephemeral drainage channels shown in Figure 4 of the HP report, only minor tributaries were not evaluated during field HP application. However, HP reaches were evaluated within close proximity and downgradient to these minor tributaries. Therefore, in the absence of springs, and given the consistency of stream characteristics within headwater drainage basins, there is considerable rationale to conclude that a similar hydrologic regime exists in these smaller drainage basins.

The above comment, "this is of particular concern since waters and tributaries in Rustler Canyon, Martin Canyon, drainage C-4 and C-19 were initially determined to be ephemeral but were later found to have flow present after further investigation prompted by NMED" is inaccurate.

- Rustler Canyon was scored as non-ephemeral by ARCADIS field staff and as a result was never proposed for ephemeral classification. Therefore, further investigations for Rustler Canyon were not performed.
- Martin Canyon was scored as ephemeral during Level 1 Field Evaluations (see Appendix F for HP field forms and photo-documentation that support an initial ephemeral score for Martin Canyon based on HP application), but was not proposed for an ephemeral classification in the May 2013 report based on historical observations of CLFs. The CLFs have not been documented in Martin Canyon since 1998. Further investigations for Martin Canyon were not performed and NMED did not document flows.
- Although reaches C-4 and C-19 were scored as ephemeral reaches during HP field evaluations (see Appendix C for HP field forms and photo-documentation that support an initial ephemeral score for these reaches based on HP application), these two reaches were not proposed for ephemeral classification in the May 2013 HP report. This was due to proximity to the CLF critical habitat transect and subsequent observations made by NMED of isolated pools, or potential pools, located in other reaches of Subwatershed C. Please note that Chino was present at and participated in these field observations with NMED. Based on the three field reconnaissance surveys and resulting photos and field notes, Chino further responds as follows:

- Flow was not documented by NMED at the C-4 and C-19 reaches. Marginal flow from Bolton Spring was observed, which was not proposed for an ephemeral designation.
- Additionally, HP reach C-4 was not re-surveyed or assessed to have any isolated or potential pools. Two small pools were noted approximately 1,000 feet upstream of C-4. Pools were not encountered upstream again for another 3,000 feet approximately.
- NMED field notes and photo of a location which coincides with HP reach C-19 documents that this site loses bedrock pool characteristics and was completely dry.
- Significant reaches of dry channels containing vegetation types that do not require significant water were also noted during the NMED reconnaissance. In isolated pools, limited aquatic life was noted.
- Based on NMED reconnaissance notes, ARCADIS's observations and HP application, and NMED HP guidance, a gradient of ephemeral to intermittent reaches possibly occurs throughout upper Subwatershed C. As a result, and considering the CLF critical habitat, the May 2013 draft HP report did not propose an ephemeral designation for any reaches in upper Subwatershed C.

Chino believes that, based on the HP study results, the comments provided herein, and the revisions made to the HP report, that ephemeral classifications proposed are defensible and reflective of the natural hydrologic regime in those STSIU drainages. In response to the USEPA Region 6 comment that a '*defensible UAA relies on current findings, not "suggestions" from previous site investigations',* the third paragraph of Section 6 has been modified in the revised HP report to state that ephemeral determinations were based on the application of the Level 1 HP procedure, and the finding that mining activities do not impact the natural hydrologic regime of the drainages proposed for ephemeral classification.

The wording "observations and suggestions from previous site investigations" has been modified in the revised HP report to state that classification of the ephemeral drainages in STSIU is consistent with direct observations reported by other site investigators. Multiple, direct observations of the STSIU hydrology recorded by different environmental professionals during different times are relevant to this study. Inclusion of that type of information is listed as an option in "*Other information that may be considered"* in NMED (2011) for Level 2 Office Procedures.

<u>USEPA Region 6 Comment:</u> In its technical review, Region 6 found that although the Chino Mines report touched on a number of important points, it lacked adequate detailed discussion and used generalized data to support the conclusion that the state's limited aquatic life use designation is appropriate for the subset of waters identified. The Introduction of the Chino report refers to a number of what apparently are regulatory, enforcement and/or remedial actions. These actions may be important to understanding the mine site, particularly given the potential influence on surface and groundwater, but the Chino report fails to explain how they relate to determining the appropriate uses in the STSIU waters.

<u>Chino Response:</u> The ephemeral designations proposed for the subset of drainages described in Section 6 of the report were determined by applying the HP according to NMED (2011) guidance and in many instances provided data and supporting evidence beyond the NMED guidance. Chino believes the responses provided in this document and the revisions made to

the Chino HP report clarify details about application of the HP and sufficiently address comments from USEPA Region 6.

The revised report provides an overview of ongoing regulatory programs at Chino Mine Site, including studies conducted as part of the Chino Mines AOC and groundwater discharge permits. As described in these responses, no enforcement or corrective actions have been conducted that impact the natural hydrologic regime of the STSIU drainages proposed for an ephemeral designation. Because this HP-UAA study is solely evaluating whether the natural hydrology limits aquatic life uses in STSIU drainages, a comprehensive review of these actions is beyond the scope of this study, except for information required to determine that these actions have not affected the natural hydrologic regime of STSIU drainages.

USEPA Region 6 Comment: The Level 1 assessments in Appendix A suggest that a subset of the STSIU waters may be predominately ephemeral. However, several sections of the Chino Mines report that touch on or directly address climatic conditions (drought, precipitation and flow), authors appear to have relied on data sources that were not temporally related to the June 2011 field evaluations which is inconsistent with the guidance for UAA's relying on the SWQB's Hydrologic Protocol. The Region found and cited climate data that indicate significant drought conditions prevailed during the HP field assessments. The inconsistencies between the sources cited in the Chino Mines report and those found by the Region lead to significant questions concerning the validity of the Level 1 assessments and the conclusions about designated uses that were drawn from them.

Chino Response: Clarification about data sources used to assess climatic conditions are provided in the above responses and summarized below:

- Drought conditions were assessed consistent with the methods described in the NMED (2011) HP guidance, and consistent with methods used in other USEPA Region 6-approved HP UAAs. Two sources of information (NDMC and WRCC) indicated the 12-month SPI was within the NMED (2011) drought-index acceptability range. As a result, ephemeral determinations made for the subset of drainages described in Section 6 of this report are considered reliable and acceptable when interpreted based on the HP guidance. Other climate evaluations were included in the Chino report in response to NMED comments about historical conditions (precipitation records) and/or as an additional source of information (flow gage data), as described below.
- The long-term precipitation record from the Fort Bayard climactic station was assessed in response to an NMED comment about conditions during the early 1900s (Paige, 1916). Chino located precipitation records that dated back to this period from a station approximately 5 miles away from the STSIU area. Despite the precipitation record ending about a month and a half before the HP field work, these data are relevant to assessing how the drought conditions leading up to the time of the survey compare to the long-term record (note that the HP-recommended drought index utilizes the preceding 12-month period, and the Fort Bayard weather station contains local precipitation data for 10 and a half of these months and conservatively assumes that there was no precipitation for the period when no data were collected). Based on this evaluation, precipitation recorded adjacent to the STSIU area during the months preceding field evaluation was not considered historically anomalous. Similar to the precipitation record, flow data from a gage located approximately 12 miles away from STSIU were included in the report as an additional source of information to assess

drought conditions. While this flow gage is not located downstream of the STSIU drainages, its geographic proximity to STSIU and being located within the larger Mimbres River watershed provides an overall indication of regional drought and hydrologic conditions.

- Taken together, the precipitation and flow data provide secondary sources that further validate the primary drought metric (the 12-month SPI) used for NMED HP evaluations. As described by NMED (2011), the HP and scoring mechanisms have been designed with redundancy (i.e., multiple indicators) to allow for satisfactory ratings even after recent rainfall or during drought conditions. For example, indicators such as riparian vegetation characteristics (or lack thereof) and rooted upland plants growing in the streambed provide strong indications of long-term hydrologic conditions.

USEPA Region 6 Comment: Region 6 believes that determining the appropriate designated uses for the STSIU drainages depends on understanding the natural hydrology and climate conditions as well as the effect of mining activities, remediation, permitted discharges, surface diversions and alterations in surface and groundwater flow may have on use attainment in these waters. Based on the concerns outlined in this TSD, Region 6 has determined that it cannot technically approve the Chino report. This technical review does not constitute a final action under §303(c) of the Clean Water Act (CWA), but is an interim action utilizing previously approved performance-based provisions (*See* 65 FR 24647, 24648 ((April 27, 2000)).

Chino Response: Permitted stormwater discharges to drainages are managed under the National Pollutant Discharge Elimination System (NPDES) Multi-Sector General Permit (MSGP) #NMR05GD16 at Chino Mines. During the time of the HP study, permitted stormwater outfalls were located in Whitewater Creek, Hanover Creek, Lampbright Draw, and Lucky Bill Canyon – none of which are STSIU drainages evaluated in the HP study. These permitted discharges occur only during storm flow events, and pursuant to NPDES MSGP #NMR05GD16, best management practices and containment structures are in place to control and contain any stormwater runoff that is potentially impacted by industrial activities. Therefore, these permitted stormwater discharges do not contribute sustained flow that could alter the natural hydrology of these drainages. In addition, a permitted stormwater discharge located in the headwater reach of Rustler Canyon is fully contained on site and thus does not contribute storm flow into Rustler Canyon. Since the time of the Chino HP survey, additional stormwater discharges have been permitted in Subwatershed E (the drainage west of Hurley) along a haul road that connects Highway 180 to the Chino Limestone Quarry located in Cameron Creek Watershed (the watershed adjacent to the western boundary of Subwatershed E). Stormwater outfalls located along the haul road are equipped with berms and rock check dams to reduce sedimentation into nearby drainages. However, because these are stormwater discharges, they do not alter the hydrology of Subwatershed E drainages (i.e., they discharge only in direct response to precipitation events).

In response to the above USEPA Region 6 comment, potential alterations in groundwater flow were further assessed through searches of well permit data recorded by the New Mexico Office of the State Engineer. The New Mexico Office of the State Engineer maintains records of well permits and details including well construction, well use, depth to groundwater, extraction information, and location coordinates. Of primary importance for determining potential impacts to surface water flows are the location, the depth to groundwater and diversion information. There are no recorded wells used for extraction located within the drainage basins where ephemeral designation is being considered except for Subwatershed Drainage E. Three wells

located within Subwatershed Drainage E, in the vicinity of the Silver City airport, are used for extraction for municipality and private (non-mine site) purposes. Total withdrawals listed on the permits are less than 30 acre feet per year and the depth to ground water for two of the wells is 70 and 145 feet below ground surface. Depth to groundwater information is not available for the third well. A monitoring well located to the north of the drainage, however, has a depth to groundwater of 165 feet also supporting the deep depth to groundwater of this drainage. Based on the depth to groundwater in addition to the field conditions observed, groundwater is not at an elevation to contribute to the surface water flow of the Subwatershed Drainages E regardless of the withdrawals. Additionally the results of the well records reviewed over the entire study area indicate that there are no extraction wells in other drainages for which an ephemeral classification is being considered that would likely impact stream hydrology.

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