Underground Injection Control Program

AREA PERMIT

Class III In-Situ Production of Copper
Permit No. R9UIC-AZ3-FY19-1

Florence Copper Project
1575 West Hunt Highway
Florence, Arizona 85132

Issued to:

Florence Copper, LLC
1575 West Hunt Highway
Florence, Arizona 85132

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PART I. AUTHORIZATION TO CONSTRUCT AND INJECT

Pursuant to the Underground Injection Control regulations of the U.S. Environmental Protection Agency (EPA) codified at Title 40 of the Code of Federal Regulations, Parts 124, 144, 146, 147, and 148,

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is hereby authorized, contingent upon Permit conditions, to construct and operate a Class III injection well commercial in-situ copper recovery (ISCR) facility and engage in ISCR operations at the Florence Copper Project (FCP or "Project"). The FCP site is located in Township 4 South, Range 9 East, in portions of Sections 26, 27, 28, 33, 34, and 35 in Pinal County, Arizona, approximately two miles northwest of the business district of Florence, Arizona, as depicted in Figure A-1 in Appendix A.

The FCP will consist of approximately 1,765 Class III injection and recovery wells, as well as 90 perimeter, and 45 observation wells over the course of the planned operational life. The ISCR wellfield will be developed within the 212-acre mineral resource area (ISCR area) identified as the "mine zone" in the aquifer exemption that the USEPA granted in May 1997 in conjunction with UIC Permit AZ39600001 which was issued to the prior property owner, BHP Copper, Inc. (BHP). Each well installed in the ISCR area will be constructed using a standard design and each well may serve multiple purposes during the life of the facility. ISCR wells will be used for injection, recovery, observation, perimeter hydraulic control, or rinse verification.

This Permit authorizes injection of an acidic solution into the Bedrock Oxide Zone at depths greater than 40 feet below the top of the Bedrock Oxide Zone (the "Exclusion Zone") for the purpose of copper recovery. The Bedrock Oxide Zone is located approximately 450 to 1,400 feet below ground level and is within the EPA-approved aquifer exemption area. The ISCR wellfield area will be surrounded by six (6) USDW monitoring wells and eight (8) fault monitoring wells in addition to 27 point-of-compliance (POC) and two (2) future monitoring well clusters located within the 500-foot radius circular Area of Review (AOR, which is defined in 40 CFR §146.3) that circumscribes the wellfield as depicted in Figure A-1, Appendix A.

Annular Conductivity Devices (ACDs) will be installed on FCP's injection, recovery, perimeter, and observation wells to monitor above the Bedrock Oxide Zone for upward ISCR fluid movement in the wellbore annulus and in the overlying basin fill units. Two (2) additional monitoring wells will be installed in the first resource block to be activated to monitor groundwater quality in the overlying basin fill units. Depending on results of ACD testing, EPA may require an additional 49 monitoring wells completed in the overlying basin fill units throughout the wellfield area.

The 212-acre ISCR area has been divided into approximately forty-eight (48) resource blocks for planning purposes, as displayed in Figure A-1; however, this Permit allows the size and orientation of the resource blocks to be altered in the future as necessary to accommodate

planning changes and operational conditions. Each resource block will be developed incrementally with three or more groups of ISCR wells as well construction and supporting infrastructure is completed. Operational units in the resource blocks will be developed, operated, rinsed, and closed in stages. The planned sequence of wellfield development by year is shown on Figure A-2, Appendix A. Each resource block measures approximately 500 feet by 500 feet and has an area of 5.7 acres. The size of the resource blocks will also vary to accommodate site features and ISCR wellfield area boundaries. Approximately 60 injection and recovery wells will be installed in each full resource block. Partial resource blocks located at the edge of the ISCR wellfield will contain fewer wells than the full resource blocks.

Under the UIC Permit AZ396000001 issued in 1997, BHP constructed and operated a pilot-scale wellfield for a hydraulic control test at the FCP site. UIC Permit R9UIC-AZ3-FY11-1 replaced the UIC Permit AZ396000001 in October 2017 and authorized construction and operation of a pilot-scale ISCR facility at the FCP site referred to as the Production Test Facility (PTF) and located within the ISCR area. The existing PTF ISCR wells will be directly incorporated into the commercial-scale ISCR wellfield configuration as shown on Figure A-3, Appendix A. The well spacing and pattern shown on Figure A-3 reflects continuation of the well spacing and pattern applied at the PTF wellfield. The exact spacing and configuration of the wellfield may evolve over time to optimize performance.

Each ISCR well in a resource block will begin closure after copper recovery operations have been completed. Injection and recovery wells undergoing closure will be used to rinse the formation while injection and recovery operations continue in other areas of the ISCR wellfield. The planned sequence of rinsing is shown on Figure A-18, Attachment A of this Permit. During rinsing, rinse solution will be injected into the injection zone and recovered to restore the injection and recovery zone to primary maximum contaminant levels (MCLs) under 40 Code of Federal Regulations (CFR) Part 141 or to pre-leaching background concentrations if those concentrations exceed MCLs.

The Permittee must meet the Financial Responsibility requirements in Part II, Section L upon revocation of UIC Permit R9UIC-AZ3-FY11-1. The BHP wells are required to be plugged and abandoned under Section II.D.2 of this Permit. The PTF wellfield continues to be authorized to inject for a rinsing demonstration activity, which is subject to Section II.G.5 and II.I.1 aquifer restoration requirements of this Permit, and the existing POC monitoring wells are incorporated into the monitoring program for the commercial-scale ISCR facility pursuant to Section II.F.1 of this Permit and 40 CFR §144.39. EPA will issue authorization to drill and construct new wells only after requirements for Financial Responsibility in Part II, Section L of this Permit have been met. EPA will grant authorization to inject for new operational unit(s) in a resource block only after the requirements of Part II, Sections C, D and E.2 of this Permit have been met. Operation of each injection well will be limited to a maximum volume and pressure as stated in this permit.

All conditions set forth herein refer to Title 40 Parts 124, 144, 146, 147 and 148 of the CFR, which are in effect on the effective date of this Permit.

This Permit includes all appendices, and all items listed in the Table of Contents. Further, it is based upon representations made by Florence Copper, LLC (the Permittee) and on other

information contained in the Administrative Record. It is the responsibility of the Permittee to read, understand, and comply with all terms and conditions of this Permit.

This Permit and the authorization to construct, test, and inject issued pursuant to this Permit are for the life of the FCP. This includes the period of well construction, corrective action, and demonstrations required prior to injection, up to 24 years of mining operations, and the minimum five (5)-year post-closure monitoring period, unless terminated under the conditions set forth in Part III, Section B.1. This Permit shall also include any additional post-closure monitoring beyond five (5) years, if deemed necessary by EPA.

This Permit is issued on the date of signature below and becomes effective on October 31, 2023.

Torres, Tomas

Digitally signed by Torres, Tomas
Date: 2023.09.12 16:32:54 -07'00'

Tomàs Torres
Director, Water Division

PART II. SPECIFIC PERMIT CONDITIONS

A. REQUIREMENTS PRIOR TO DRILLING, TESTING, CONSTRUCTING, OR OPERATING

1. Financial Assurance

   The Permittee shall supply evidence of financial assurance prior to commencing any well drilling and construction, in accordance with Section L of this Part.

2. Field Demonstration Submittal, Notification, and Reporting

   a. Prior to each demonstration required in the following Sections C through E, the Permittee shall submit plans and specifications for procedures to the EPA Region 9, Groundwater Protection Section for approval. The submittal address is provided in Section G.6. No field demonstrations in these sections may proceed without prior written approval from EPA.

   b. After EPA approves the plans/procedures, the Permittee must notify EPA at least thirty (30) days prior to performing any required field demonstrations in order to allow EPA to arrange to observe if so elected.

   c. The Permittee shall submit results of each field demonstration required in this Part to EPA within thirty (30) days of completion, unless otherwise noted.

B. AQUIFER EXEMPTION

1. Exempted Zone

   EPA approved an Aquifer Exemption at the FCP site on May 1, 1997. Pursuant to 40 CFR §§144.7 and 146.4, the exempted portion of the aquifer at the FCP site is defined by the following lateral and vertical boundaries:

   a. Lateral Aquifer Exemption Boundary

      The lateral aquifer exemption boundary is described in the existing Aquifer Exemption in Exhibit H-1 in Appendix A as being located 500 feet beyond the mine zone boundary referred to as the in-situ copper recovery wellfield, which is depicted in Figure H-1 in Appendix A.

b. Vertical Aquifer Exemption Boundaries

The upper and lower boundary of the exempted aquifer are described in the existing Aquifer Exemption in Exhibit H-1 in Appendix A, as the following:

The upper aquifer exemption boundary is defined as 200 feet above the oxide zone, or the base of the Middle Fine-Grained Unit (MFGU), whichever is further below ground surface. The lower aquifer exemption boundary is defined by the base of the reactive interval amenable to copper leach solutions. The lower boundary encompasses the Bedrock Oxide Zone, which contains an economical amount of copper, and copper in the Sulfide Zone that is leachable.

The vertical aquifer exemption boundaries are depicted in Figure H-2 in Appendix A.

2. No Migration into or between Underground Sources of Drinking Water (USDWs).

Pursuant to 40 CFR Parts 144 and 146 and the conditions established herein, during well construction, corrective actions, and testing, up to twenty-four (24) years of mining operations, and the minimum five (5)-year post-closure monitoring period, the Permittee shall ensure that there is no migration of injection fluids, process by-products, or formation fluids beyond the Aquifer Exemption described at Part II, Section B.1 and delineated in the existing Aquifer Exemption in Appendix A of this Permit.

3. Adequate Protection of USDWs.

Pursuant to §§144.12 and 146.10(a)(4), the Permittee shall adequately protect USDWs by commencing, within sixty (60) days after completing copper recovery operations at each resource block in the ISCR area, restoration of groundwater in the injection and recovery zone of the resource block to primary maximum contaminant levels (MCLs) under 40 CFR Part 141, or to pre-operational concentrations if those concentrations exceed MCLs, and by subsequently plugging and abandoning the wells in the FCP in accordance with Section II.I.1, Restoration and Plugging & Abandonment Plan, Appendix C, Plugging and Abandonment Plan, and Appendix F, Closure and Post-Closure Plan.

C. WELL AND WELLFIELD CONSTRUCTION

1. Wellfield Development

a. The ISCR area of the FCP site is approximately 212 acres in size and is divided into resource blocks for planning purposes, as depicted in Figure

A-1 in Appendix A of this Permit. The ISCR wellfield will be developed in stages, with not more than 462 injection and recovery wells in operation or rinsing at any one time. Figure A-19 in Appendix A shows the typical configuration of the ISCR wellfield, perimeter, observation, POC, and other monitoring wells during the first year of planned ISCR development. As the wellfield expands in subsequent years, the perimeter and observation wells will move outward, maintaining the same spacing as shown on Figure A-19.

b. Each resource block measures approximately 500 feet by 500 feet and has an area of 5.7 acres. The size of the resource blocks will vary to accommodate site features and ISCR wellfield boundaries. Approximately 60 injection and recovery wells will be installed in each full resource block. Partial resource blocks located at the edge of the ISCR wellfield will contain fewer wells. Each resource block will be developed incrementally with three or more groups of ISCR wells as well construction and supporting infrastructure is completed. The size and orientation of the resource blocks may be altered as necessary to accommodate planning changes and operational conditions.

c. The Project's injection and recovery wells will be arranged in a five-spot pattern that effectively surrounds each injection well with four recovery wells, which is referred to as an operational unit. The pattern will be repeated throughout the resource block areas and the ISCR area. The existing PTF ISCR wells, as noted in Tables E-17 and E-23 in Appendix C of this Permit, will be directly incorporated into the ISCR wellfield configuration as shown on Figure A-3 in Appendix A. The well spacing and pattern shown on Figure A-3 reflects continuation of the well spacing and pattern applied at the PTF wellfield.

d. The exact spacing and configuration of the wellfield may evolve over time to optimize performance. The planned sequence of wellfield development by year and the resource block numbers are shown together on Figure A-2 in Appendix A. The Permittee shall provide an update of the wellfield configuration and planned development sequence of operational units in each resource block for the coming year on an annual basis pursuant to the reporting requirement at Section II.G.2 of this Permit.

2. Location of Project Wells

a. The FCP's injection, recovery, observation, perimeter and monitoring wells shall be constructed within the designated area delineated in Figure A-1 in Appendix A and located in Township 4 South, Range 9 East, Section 28 in Pinal County, Arizona, centered at coordinates latitude 33 degrees, 3 minutes, 1.39 seconds North and 111 degrees, 26 minutes, 4.69 seconds West. The proposed coordinates for each of the planned injection,

recovery, observation, perimeter, and monitoring wells within a resource block and monitoring wells surrounding the ISCR wellfield by installation year are listed in Tables E-1 through E-51, Appendix C of this Permit. Each of the Tables represents the wells planned for installation within one resource block.

b. After drilling is completed for a group or groups of wells in a resource block, the Permittee must submit final well location coordinates, distances in feet from the closest section lines and latitude/longitude coordinates of the wells constructed under this Permit, including all monitoring and POC wells. The distances and direction of each monitoring and POC well from the FCP wellfield shall also be provided in the Final Well Construction Report required under paragraph 10(a) of this section. If final well coordinates differ significantly from the proposed coordinates described in paragraph (a) above, justification and documentation of any communication with and approval by EPA shall be included.

3. Logging and Testing during Drilling and Construction

Open-hole geophysical logs shall be run in each well boring for the purpose of formation evaluation, depth control, and detection of borehole anomalies. Geophysical tools will include caliper, gamma-ray, temperature, directional surveys, and electrical logs. In addition, compensated neutron-density logs will be run in selected borings within the ISCR wellfield at a rate of one per resource block, a total of approximately 48 neutron-density logs. The planned frequency of one neutron-density log per resource block places the logging locations approximately 500 feet apart, resulting in a distribution of neutron-density data that will identify significant changes in porosity across the wellfield if such were to occur. The resulting porosity dataset will be of sufficient size to support statistical analyses, and evaluation of porosity effects on the groundwater flow field within and surrounding the ISCR wellfield. The planned neutron-density logging locations are shown on Figure C-4d in Appendix B of this Permit. Porosity values determined from the neutron-density logs shall be compared to porosities applied to the groundwater flow model in the ISCR wellfield area, and the porosity values in the model shall be updated accordingly for the affected area if differences are found in the log porosities.

Cased-hole geophysical logs, including gamma ray, temperature, sonic, 4 pi density, dual density, fluid conductivity, nuclear magnetic resonance, dual induction, and gyroscopic deviation logs shall be run in all injection, recovery, observation, perimeter, and monitoring wells over the entire length of each well after the casing has been installed and cemented to surface. Additional geophysical surveys may be conducted as required by EPA. The logs run for cement bond evaluation will enable analysis of the bond between the cement and casing, as well as between the casing and formation, and shall allow detection and assessment of any micro-annulus between the casing and cement as well as any cement

channeling in the borehole annulus. Refer to Appendix D for information on EPA Region 9 temperature logging requirements.

4. Drilling,Work-over, and Plugging Procedures

Drilling, work-over, and plugging procedures must comply with applicable portions of the Arizona Oil and Gas Conservation Commission's (AOGCC) requirements in the Arizona Administrative Code, found at Title 12, Natural Resources, Chapter 7, Article I, R12-7-108 to R12-7-127. Where any conflict or inconsistency exists between the AOGCC requirements and the Permit conditions, the Permit conditions shall control. Drilling, work-over, and plugging plan/procedures shall be submitted to EPA for approval. Once approved, a thirty (30)-day advance notice shall be submitted to EPA for witnessing purposes. Information in the plan/procedures for the proposed work shall include the following:

a. Details for cementing casing strings;

b. Records to be maintained of daily Drilling Reports (electronic and hard copies);

c. Blowout Preventer (BOP) System testing on recorder charts including complete explanatory notes during the test(s), if applicable;

d. Casing and other tubular and accessory measurement tallies.

The Permittee must provide the information for the proposed work listed on the appropriate reporting forms, such as EPA Form 7520-18, Completion Report for Injection Wells, EPA Form 7520-19, Well Rework Record, Plugging and Abandonment Plan, or Plugging and Abandonment Affidavit (refer to list in Appendix I), with the thirty (30)-day advance notice. The Permittee must also comply with the requirements of the Arizona Department of Water Resources minimum construction standards in the Arizona Administrative Code found at Title 12, Chapter 15, Article 8, Well Construction and Licensing of Drillers.

5. Well Casing and Drilling

The well construction procedures described in Attachment C of the Permit application and schematic details submitted in Attachment C of the application are hereby incorporated into this Permit as Appendix B and shall be binding on the Permittee. Where any conflict or inconsistency exists between Appendix B and the Permit conditions, the Permit condition shall supersede the procedure or detail in Appendix B. All new Project injection, recovery, observation, perimeter, POC, and monitoring wells required by EPA shall be cased and cemented to prevent the migration of fluids into or between USDWs. The casing and cement used in the

construction of each newly drilled well shall be designed for the life expectancy of the well and shall be maintained until the well is plugged and abandoned.

EPA may require minor alterations to the construction requirements based upon information obtained during well drilling and related operations. Final casing setting depths will be determined by the field conditions, well logs, and other input from the Permittee and EPA staff. EPA approval must be obtained for any revisions prior to installation, and these will be documented in the Completion Report for Injection Wells (See paragraph 10(a) below).

6. Cementing

Project injection, recovery, observation, and perimeter wells will be of a single design and will each use the same cementing procedure. The well borings will be of a constant diameter, drilled in a single stage. Once the well casing, screen, and filter pack have been installed in the boring, cementing of the upper portion of the well casing, from the bottom of the bedrock Exclusion Zone to ground surface, will be accomplished by pumping a cement slurry down a tremie pipe positioned with the lower end near the bottom of the Exclusion Zone, forcing the cement to fill the annular space between the borehole and casing from the bottom up to the surface. Cement grout will be placed to completely fill the well annulus within the specified interval. Prior to pumping, the cement grout will be passed through a ½-inch slotted bar strainer in order to remove any unmixed lumps.

The discharge end of the tremie pipe will be continuously submerged in the cement until the zone is completely filled. An acid-resistant, sulfate-resistant, Portland Type V cement or an EPA-approved substitute shall be placed in the well annuli of all wells from the bottom of the casing to land surface. The well casing will be hung in tension until the cement has cured. The well casing will be filled with a fluid of sufficient density to maintain pressure equalization with the cement slurry in the annulus to prevent collapse of the well casing during the cementing operation.

Water and/or appropriate mud-breaker chemicals will be circulated through the casing or tremie pipe prior to cement placement to reduce mud viscosity and assist in removal of mud from the borehole/casing annulus. An excess quantity of cement will be pumped into the annular space in order to verify “clean” slurry returns from the well prior to terminating the cementing operation. Following placement of the cement slurry, the cement will be allowed to cure for a minimum of 24 hours before performing additional operations on the well.

a. The cement shall be Type V, unless the Permittee submits the following information to the EPA regarding a Type V substitute:

i. The results of an immersion test for resistance to pregnant leach solution of equivalent mass samples of Type V cement and any proposed substitute cement,

ii. A comparison of the percentage weight change between samples, and

iii. A demonstration that the substitute experiences little visual change, a weight increase or decrease within 5 % to 8 % and no significant change in compressive strength.

Upon completion of this demonstration, and subject to EPA approval, a substitute cement that meets these criteria may be substituted for Type V cement for well construction.

7. Monitoring Devices

The Permittee shall install and maintain in good operating condition:

a. A tap on the discharge line between the injection pump and the wellhead for the purpose of obtaining representative samples of injection fluids; and

b. Devices to continuously measure and record injection pressure, flow rates, injection and production volumes, which shall be subject to the following:

i. Pressure gauges shall be of a design to provide:

(A) A full pressure range of at least fifty (50) percent greater than the anticipated operating pressure; and

(B) A certified deviation accuracy of five (5) percent or less throughout the operating pressure range.

ii. Flow meters shall measure cumulative volumes and be certified for a deviation accuracy of five (5) percent or less throughout the range of rates allowed by this Permit.

c. Conductivity Sensors

A conductivity sensor shall be placed in each observation well in the injection zone for monitoring and control of ISCR fluid movement. Fluid electrical conductivity will be monitored at the observation wells using an electronic sensor. The electrical conductivity sensor may be combined with a pressure transducer as a single instrument, or it may be a separate instrument, depending on the model of instrument selected.

d. Annular Conductivity Devices

The Permittee shall rely on a monitoring program to demonstrate mechanical integrity in the Project's injection, recovery, observation and perimeter wells, under 40 CFR §146.8(a)(2) and Section II.E.3.a.ii.A of this Permit. Each well shall be equipped with two annular conductivity devices (ACDs) to detect vertical channels adjacent to the well bore at the limits of the exempted zone. An ACD will be installed on Fiberglass Reinforced Plastic (FRP) or Polyvinyl Chloride (PVC) well casings of all injection, recovery, observation, and perimeter wells in a location that is above the oxide zone but no higher than 10 feet below the MFGU or no more than 190 feet above the bedrock/LBFU contact where bedrock is separated from the MFGU by more than 200 feet. The other ACD will be installed above the vertical limit of the exempted zone and shall be placed in the Upper Basin Fill Unit (UBFU) as close to the MFGU as possible and not more than 10 feet above the MFGU, or placed in the Lower Basin Fill Unit (LBFU) not more than 10 feet above the exempted zone if the MFGU base is more than 200 feet above the bedrock/LBFU contact (vertical limit of the exempted zone).

Additional ACDs, referred to as early warning ACDs, will be installed at a depth of not higher than 20 feet above the bedrock/LBFU contact in 10 percent of the injection wells to provide a dataset that will support statistical analysis of monitoring results and early warning of potential vertical solution migration into the LBFU.

The early warning ACD installation will be prioritized as described in Section C.2.5, Appendix B of this Permit. Where mapped faults transect a resource block, two early warning ACDs will be installed on injection wells that are projected to penetrate the fault plane. An additional four early warning ACDs will be installed on injection wells at locations distributed across the resource block to provide early warning and protection from potential vertical migration of ISCR fluids into the LBFU and UBFU. Appendix B of this Permit includes illustrations of a typical ACD installation for monitoring mechanical integrity and for early warning of migration of ISCR fluids into the LBFU and UBFU.

The ACDs will consist of a pair of metal bands spaced approximately three (3) feet apart and connected to electrical wires that extend to the surface. The ACD shall be constructed of materials suitable for contact with the annular seal materials and the process related solutions. Details of the ACDs are presented in Figure C-4 and C-4a in Appendix B.

The Permittee shall perform a demonstration of the ACD response to upward movement of ISCR fluids in the wellbore annulus and in the formation adjacent to injection wells as described in C.2.5.2 of Appendix

B. During construction of the first resource block to be activated, the Permittee will install one ACD each, on two injection wells, at a depth below the 40-foot Exclusion Zone. The Permittee will extend the cement seal on the selected injection wells to a depth of 50 feet below the top of bedrock (10 feet below the Exclusion Zone). The ACDs will be installed below the Exclusion Zone within the 10-foot well extension. See Figure C-1 in Appendix B. Proposed ACD demonstration procedures must be submitted to EPA for review and approval in accordance with Section II.A.2 of this Permit. The ACD demonstration will begin with the commencement of ISCR operations at the first resource block to be activated and conclude at approximately 6 months after injection begins. The demonstration shall be conducted during the initial Part II mechanical integrity evaluation of injection wells in accordance with Section II.E.3.a.ii of this Permit. An inconclusive demonstration of ACD response to upward movement of ISCR fluids will require implementation of additional analysis and contingency monitoring in the overlying UBFU and LBFU as described in the contingency actions in Section C.2.5.3 of Appendix B and in accordance with Section II.F.1 of this Permit.

8. Injection Interval

The Permittee shall only inject fluids at depths greater than forty (40) feet below the top of the Bedrock Oxide Zone (which is referred to herein as the Exclusion Zone). To ensure that the injection interval is at least forty (40) feet below the top of the Bedrock Oxide Zone, the Permittee shall case and cement all injection wells in a manner described at Sections II.C.5 and C.6 of this Permit from ground surface to at least forty (40) feet below the top of the Bedrock Oxide Zone. The Permittee will develop the injection interval for each well by drilling into the Bedrock Oxide Zone, beyond the bottom of the FRP casing and cemented interval. Well screen and short blank PVC or other acceptable casing sections will be installed through the oxide interval below the bedrock Exclusion Zone. Injection into the open borehole below the bedrock Exclusion Zone is an option where considered appropriate.

9. Injection Formation Testing

The Permittee shall perform aquifer pump tests prior to injection in resource blocks in order to evaluate subsurface characteristics of the Bedrock Oxide Zone, overlying basin fill units, and the confining MFGU within the FCP AOR. Testing will be conducted to confirm hydraulic data and to further characterize formation hydraulic variability across the site, including faulted areas. Proposed formation testing procedures must be submitted to EPA for review and approval in accordance with Section II.A.2 of this Permit. Test results will be reported to EPA in accordance with Section II.G of this Permit. Results of the aquifer tests will be compared to parameters used in the groundwater flow model, and the model parameters will be updated accordingly if the resulting hydraulic conductivity

values are different from those used in the model. The additional hydraulic data generated from these tests will be incorporated into an annual update of the project groundwater flow model as described in Section II.J of this Permit.

10. Final Completion Report for Injection Wells

    a. The Permittee must submit a final well construction report for each new or worked over Project well, including logging and other results, with a schematic diagram and detailed description of construction, including driller's log, materials used (e.g., tubing tally, cement, and other volumes), to EPA within sixty (60) days after completion of all ISCR wells for the operational unit(s) in a resource block and monitoring wells required to be installed. Refer to EPA Form 7520-18 listed in Appendix I. Construction details, downhole equipment, depths to key formation tops and the USDW base, and screened interval depths will be included in the well completion report and schematics of all Project wells.

    b. Injection operations may not commence until the planned incremental groups of ISCR wells in the resource block, required monitoring wells, and formation testing is complete, necessary reports are submitted, and EPA has inspected or otherwise reviewed and approved the construction and other details for the permitted wells and notified the Permittee of EPA's approval.

11. Proposed Changes and Work-overs

    A well work-over is any physical alteration or addition to an existing well that results in a change in the composition, diameter, perforations, screen depths, tubing, or depth of the well casing or a change in the cement in the outer annulus.

    a. The Permittee shall give advance notice to EPA, as soon as possible, of any planned physical alterations or additions to the permitted and monitoring wells. Any changes in well construction require prior approval by EPA and may require a permit modification under the requirements of 40 CFR §§144.39 and 144.41.

    b. In addition, the Permittee shall provide all records of well work-overs, logging, or other subsequent test data, including required mechanical integrity testing, to EPA within thirty (30) days of completion of the activity.

    c. Appendix I contains a list of the appropriate EPA reporting forms for well changes or work-overs and other operations and notifications. Refer to EPA Form 7520-19.

d. Demonstration of mechanical integrity shall be performed within thirty (30) days of completion of workovers or alterations and prior to resuming injection and recovery activities, in accordance with Section E.3 of this part.

12. ACD Demonstration Monitoring Wells

Prior to conducting the ACD demonstration, the Permittee will install two monitoring wells (M72-UBF and M73-LBF) above the orebody in the first resource block sited based on the location of known faults and/or areas of known higher fracture intensity. Well M72-UBF will be completed in the UBFU, with a 10-foot well screen installed within 20 feet of the top of the MFGU. Well M73-LBF will be completed in the LBFU, with a 10-foot well screen installed within 20 feet of the bottom of the MFGU. The proposed demonstration includes monthly data collection in wells M72-UBF and M73-LBF and analyses that will be conducted once injection begins and throughout the period of the demonstration as described in Section C.2.5.2 of Appendix B and in Sections II.F.1 and II.F.6.c of this Permit.

D. CORRECTIVE ACTION

Before injection and recovery wells are placed in service in a resource block:

1. All existing non-Class III wells and core holes within the Project AOR shall be abandoned according to the Plugging and Abandonment Plan (Appendix C) and the following conditions in Section D.2 below over the life of the mine. The identification, location, and construction details of the wells and core holes to be plugged and abandoned are listed in Tables A-6, A-7, and A-8 of Appendix A and the Plugging and Abandonment Plans (EPA Form 7520-19) for each well and core hole within the AOR which are included in Appendix C as described in Section D.2 below. EPA shall be notified, and final plugging and abandonment (P&A) plans and procedures shall be submitted to EPA for approval at least 30 days in advance of plugging operations.

2. Corrective action will be taken to prevent the migration of injected fluids between or into USDWs within or adjacent to the AOR. Corrective action includes plugging and abandonment of all wells and core holes within the AOR, with the exception of Class III wells, prior to placing an injection well into operation within 500 feet of the well or core hole. The wells and core holes will be plugged and abandoned in accordance with the Plugging and Abandonment Plan provided in Attachment E of the Application and included in Appendix C of the Permit.

   All non-Class III wells currently existing within the AOR, which will be plugged and abandoned prior to injection within 500 feet, are listed in Table A-7. Plugging and abandonment forms for each of the wells listed in Table A-7 are included in Exhibit E-2. All open core holes currently existing within the AOR, which will be

plugged and abandoned prior to injection within 500 feet, are listed in Table A-8. Plugging and abandonment forms for each of the core holes listed in Table A-8 are included in Exhibit E-3. Plugging and abandonment forms for the BHP Class III wells listed in Table A-6 are included in Exhibit E-4. All of these tables and exhibits are included for reference in Appendix C.

E. WELL OPERATION

1. Operations Plan

The revised Operations Plan submitted with the Permit application for the FCP is incorporated into this Permit as Appendix E and shall be binding on the Permittee with the following conditions. Where any conflict or inconsistency exists between the Operations Plan and the permit conditions, the permit condition shall supersede the language in the Plan.

a. The approved ISCR injection and recovery rates are described below:

During ISCR operations, the injection rate shall not exceed 12,650 gpm, and the extraction rate shall not fall below 106 percent of the injection rate on a daily average basis without prior written approval of a lower percentage from EPA.

Injection rates in all wells will be proportionate to the length of the injection interval. Consequently, the rate and daily volume of fluids injected may vary from well to well based on the length of the injection interval and characteristics of the oxide zone at each well site. The rate of fluid injection in wells with longer injection intervals will be greater than the rate in wells with shorter injection intervals to maintain a consistent rate of flow through the oxide zone and to achieve the desired solution contact time. Table D-1 in Appendix E shows the potential range of injection rates and daily fluid volumes based on the characteristics of the oxide zone.

The planned nominal aggregate injection rate for the ISCR wellfield is 11,000 gpm. The maximum aggregate injection rate for full-scale ISCR operations is 12,650 gpm, and the minimum extraction rate is equal to the actual injection rate plus the additional six-percent extraction required to maintain hydraulic control. At the maximum allowable injection rate, the corresponding hydraulic control extraction rate is 759 gpm, for a total withdrawal of 13,409 gpm, based on a minimum ratio between recovery and injection volumes of 106 percent.

The ISCR wells may be constructed with multiple injection intervals separated by sections of blank well casing that will allow packer assemblies to be used to focus injection into targeted intervals of the

injection zone. Both injection and recovery wells may be operated without packers. The values presented in Table D-1 reflect potential injection rates for a variety of well configurations which may be applied to compensate for oxide zone characteristics.

b. An inward hydraulic gradient of at least one foot differential between observation, recovery/perimeter and POC well triplets must be established prior to injection of sulfuric acid solution and must be maintained for demonstrating hydraulic control unless adjusted by EPA as specified in Section II.H.1.b in this Permit. A well triplet used to monitor the hydraulic gradient is one recovery or perimeter well, one observation well at the edge of the ISCR wellfield, and the nearest POC well.

   Water levels will be monitored in the observation and recovery/perimeter wells and in the oxide zone POC wells for ensuring maintenance of the required inward gradient and hydraulic control on a daily basis. The water level at recovery or perimeter wells will be compared to the water level at the observation well to demonstrate one foot of drawdown. If one foot of drawdown is not observed between recovery/perimeter and observation wells, the recovery/perimeter and observation well water levels will be compared to POC well water level to demonstrate one foot of drawdown below the ambient regional water level.

c. Actions, pursuant to Section II.H of this Permit, shall be taken to restore hydraulic control within 24 hours if the extraction to injection ratio falls below 106 percent, the inward gradient at any well triplet is less than one foot differential, or the electrical conductivity or ACD data indicate a possible loss of hydraulic control.

2. Demonstrations Required Prior to Injection

For the Project wells, injection operations may not commence until construction is complete in the operational unit(s) of the resource block, and the Permittee has complied with following mechanical integrity requirements.

The Permittee shall demonstrate that all Project wells have and maintain mechanical integrity consistent with 40 CFR §146.8 and with paragraph 3 of this section. The Permittee shall demonstrate that there are not significant leaks in the casing and tubing, and that there is not significant fluid movement through the casing/wellbore annulus or vertical channels adjacent to the injection wellbore. The Permittee may not commence initial injection into the wells, nor recommence injection after a work-over which has corrected any loss of well integrity, until the Permittee has received written notice from EPA that the demonstration provided is satisfactory and that injection is authorized.

3. Mechanical Integrity

Pursuant to 40 CFR §144.51(q), all ISCR and other Project wells (including USDW and fault monitoring, POC, and any other monitoring wells) shall maintain mechanical integrity at all times. Pursuant to 40 CFR §146.8, all ISCR wells and other Project wells shall demonstrate mechanical integrity, Parts I and II, by the following methods and schedule:

a. Methods for Demonstrating Mechanical Integrity

i. Part I: Mechanical Integrity Pursuant to 40 CFR §146.8(a)(l), the Permittee shall demonstrate Part I of the mechanical integrity requirement by using both of the following methods:

(A) A packer will be installed immediately above the proposed injection interval, the wellbore will be completely filled with water, and a hydraulic pressure equal to or above the maximum allowable wellhead injection pressure and not less than 100 pounds per square inch (psi) will be applied. This test shall be for a minimum of thirty (30) minutes. A well passes the mechanical integrity test (MIT) if there is less than a five (5) percent decrease/increase in pressure over the thirty (30) minute period; and,

(B) Continuous pressure monitoring
The tubing/casing annulus (if a packer is installed) and injection pressure in active injection wells shall be monitored and recorded continuously by a digital instrument with a resolution of one tenth (0.1) psi. The average, maximum, and minimum monthly results shall be included in the quarterly report to EPA per Section G, paragraph 2.n of this part unless more detailed records are requested by EPA.

ii. Part II: Mechanical Integrity pursuant to 40 CFR §146.8(a)(2), the Permittee shall demonstrate Part II of the mechanical integrity requirement by the following methods:

(A) An electrical conductivity monitoring program, as defined at Section II.F.6 of this Permit, designed to verify the absence of fluid movement through vertical channels adjacent to the well bore in injection, recovery, perimeter, and observation wells. In response to an above-background signal from an ACD installed on a well, which indicates possible loss of mechanical integrity, complete the actions as described in Section C.2.5.1 of Appendix B of this Permit.

(B) A demonstration that the injectate is confined to the proper zone shall be conducted and presented by the Permittee and subject to approval by EPA. Temperature logs shall be run in all injection wells prior to and after commencement of injection operations in accordance with EPA Region 9 guidance (Temperature log guidance in Appendix D) and approval. Proposed MIT procedures must be submitted to EPA for review and approval. Once approved, the Permittee may schedule the external MIT, providing EPA at least thirty (30) days notice before the external MIT is conducted. The initial demonstration shall be scheduled to occur approximately sixty (60) days after commencement of injection; and,

(C) After installing and cementing casing, work over, conducting a cement squeeze operation, or any well cement repair, the Permittee shall provide cementing records and cement evaluation logs that demonstrate isolation of the injection interval and other formations from the USDWs. Cementing records and logs shall demonstrate complete filling of the annulus between the borehole wall and well casing with cement.

Cement bond logs are required in wells constructed with steel production casing and must assess the following four objectives:

1) Bond between casing and cement;
2) Bond between cement and formation;
3) Detection and assessment of any micro-annulus
(small gaps between casing and cement); and
4) Identification of any absence of cement and cement channeling in the borehole annulus.

The Permittee may not commence or recommence injection until the Permittee has received written notice from EPA that the cement evaluation/demonstration is satisfactory.

b. Schedule for Demonstrations of Mechanical Integrity

EPA may require that an MIT be conducted at any time during the permitted life of any well authorized by this Permit. The Permittee shall also arrange and conduct MITs according to the following requirements:

i. A demonstration of internal mechanical integrity shall be made within thirty (30) days subsequent to the installation of a new ISCR or monitoring well. All FCP wells will be pressure tested for mechanical integrity in accordance with paragraph 3.a.i.A of this section. Injection wells shall be tested no less frequently than once every five years while active and every two (2) years while inactive unless abandonment or closure occurs prior to that time. Internal mechanical integrity of a well shall also be demonstrated within thirty (30) days after a work-over is conducted, the construction of the well is modified or when loss of mechanical integrity becomes evident during operation.

ii. A demonstration of external mechanical integrity using a monitoring program shall be made in accordance with the schedule in Section II.F.6 of this Permit.

iii. Results of the MITs shall be submitted to EPA in the quarterly reports.

c. Loss of Mechanical Integrity

The Permittee shall notify EPA, in accordance with Part II, Section G, Paragraph 2(j) of this Permit, under any of the following circumstances:

i. a well fails to demonstrate mechanical integrity during a test, or

ii. a loss of mechanical integrity becomes evident during operation, or

iii. a significant change in the injection pressure and/or rate occurs during normal operating conditions, or

iv. a significant increase in annular conductivity occurs during normal operating conditions.

Furthermore, for new injection wells, injection shall not commence, and for operating wells, injection shall be terminated and may not resume, until the Permittee has taken necessary actions to restore integrity to the well and has demonstrated that the well has integrity as defined at Section II.E.2(a), above.

d. Prohibition without Demonstration

After the permit effective date, injection into the well may commence only if:

i. The well has passed an internal pressure MIT in accordance with paragraph 3.a.i.A of this section; and

ii. The Permittee has received written notice from EPA that the internal pressure MIT demonstration is satisfactory.

4. Injection Pressure Limitation

a. Injection wells shall be operated at pressures less than the fracturing pressure of the Bedrock Oxide Zone. Based on field test data at the FCP site, a fracture gradient of 0.65 psi/foot (ft) of depth, measured from ground surface to the top of the injection interval, will be used to establish maximum hydraulic pressure that may be exerted on the injection zone. An injection well shall not be operated at injection pressures greater than the maximum allowable injection pressure. The maximum wellhead pressure will vary accordingly, dependent on the depth of the interval receiving the injection fluid, but in no event shall it exceed the calculated pressure that can be safely applied to well equipment. In no case shall pressure in the injection zone during injection initiate new fractures or propagate existing fractures in the injection zone or the confining zone. In no case shall injection cause the movement of injectate or formation fluids into a USDW. Injection pressures shall be monitored continuously and recorded on a daily basis. Automatic alarms and shut-in equipment shall be installed and triggered if injection pressures exceed the maximum allowable pressures.

b. Based on available formation thickness and injection zone depth data, a representative range of injection pressures have been calculated for planned injection wells and are presented in Table D-2 of Appendix E. The calculated injection pressures listed in Table D-2 reflect the anticipated minimum and maximum depths to the top of the injection zone based on available data and potential variations in well design.

5. Injection Volume (Rate) Limitation

a. The approved ISCR injection and recovery rates will be approximately as described below. During ISCR operations, the injection rate shall not exceed 12,650 gpm, and the extraction rate shall not fall below 106 percent of the injection rate on a daily average basis without prior written approval of a lower percentage from EPA.

b. The Permittee may request an increase in the maximum injection rate or a decrease in the minimum ratio of extraction to injection rate allowed in paragraph (a) above. Any such request shall be made in writing and appropriately justified to EPA.

c. Any request for an increase in injection rate or decrease in the minimum ratio of extraction to injection rate shall demonstrate to the satisfaction of EPA that the increase in volume or reduction in the minimum percent extraction to injection rate will not interfere with the operation of the facility or its ability to meet conditions described in this Permit, change its well classification, or cause migration of fluids into USDWs or beyond the ISCR wellfield AOR as depicted in Figure A-1 in Appendix A.

d. The injection rate shall not cause an exceedance of the injection pressure limitation established under item 4(a) of this section.

6. Injectate Fluid Limitations

a. The Permittee shall not inject any solid wastes as defined by 40 CFR Part 261.

b. Injection fluids shall be limited to only fluids authorized by this Permit and generated by the FCP operation. No fluids shall be accepted from other sources for injection into the permitted wells.

c. Fresh water or treated water may be injected to assess the hydraulics of the injection and recovery patterns in the ISCR wellfield to assess the performance of related surface facilities during rinsing operations, and for maintanence of hydraulic control in the buffer zone between leaching and rinsing blocks.

d. During ISCR operations, the injectate solution (lixiviant) shall consist of a dilute sulfuric acid solution that includes inorganic and organic constituents as defined below. The lixiviant shall have a pH of approximately 2 and not less than 1. Organic compounds in the lixiviant shall be limited to those listed in Section II.F.7(a) of this Permit. The average total concentration of all organics in the lixiviant listed in Section II.F.7(a) for each quarter of monthly sampling shall not exceed 10 milligrams per liter (mg/L). The estimated composition of the injectate is provided in Table 1 in Exhibit D.3 of Appendix E. Inorganic constituents in the lixiviant shall be limited to constituents in the sulfuric acid, in calcium carbonate, or other neutralizing agents used for the purposes described in Section (e) below, and to constituents resulting from the interaction of lixiviant with groundwater and minerals in the oxide zone. Concentrations of inorganic constituents in the lixiviant shall be subject to the requirements of Section (f) below.

e. During closure of operations units in resource blocks, fresh groundwater or treated water may be injected to restore the zone to federal drinking water standards or pre-operational background concentrations. The

Permittee may also adjust the pH with sodium bicarbonate or other non-hazardous neutralizing agents to aid in the precipitation of soluble metals.

The Permittee may also use treated water during formation rinsing which will supplement fresh groundwater to reduce overall water consumption and to expedite formation rinsing. The water treatment system will utilize filtration, reverse osmosis (RO), and pH adjustment to treat solution recovered from the wellfield and use the resulting treated water to supplement the rinsing injectate. The treated water quality will be equivalent to or better than formation water and of a quality sufficient to achieve the closure criteria of Section II.I of this Permit.

The Permittee will conduct monthly sampling and analysis of the treated water for water quality parameters in Table 2, Section F of this Permit to document that the quality meets the requirements described above. The Permittee shall provide these analytical results in the Quarterly report, per Section II.G.2 of this Permit.

f. At least 30 days prior to commencement of the ISCR operations under this Permit, the Permittee shall submit a report for the EPA's approval that includes the name and grade of each process chemical that is proposed to be used at the Project and that fits in one of the three following categories: (1) organic compounds to be used in the SX/EW process; (2) sulfuric acid to be used in the SX/EW process or to prepare solutions for injection; or (3) sodium carbonate or other non-hazardous neutralizing agents to be injected, or to be used in ISCR solutions. The report shall include the name and grade of each reported chemical, and a Material Safety Data Sheet (MSDS) for each. The report shall also include recommendations, with justifications, as to which constituents of the reported chemicals should or should not be included in the Level 1 or Level 2 groundwater monitoring program defined at Section II.F.2 and the injectate monitoring program defined at Section II.F.7 of this Permit.

g. The Permittee may use a process chemical not included in the reports submitted pursuant to Section (f) above provided the Permittee submits a report for EPA's approval at least 30 days prior to the date of the proposed use of the chemical and receives written approval from EPA. Reports submitted pursuant to this section during Project operations must include information required by Section (f) above.

h. The Permittee shall expand the groundwater quality monitoring program defined at Section II.F.2 and the injectate monitoring program defined at Section II.F.7 as necessary to conform to EPA's conditions of approval of reports submitted pursuant to Sections (f) and (g) above.

i. The monitoring and advance notification requirements of Sections II.E.6 and II.F.7 apply only to injectate solution prior to injection and to constituents of process chemicals that may become part of the lixiviant. The requirements do not apply to pregnant leach solution (PLS) that is being re-injected to increase the concentration of copper in the PLS before it is delivered to the SX/EW plant for processing.

j. The Permittee may inject liquid carbon dioxide (CO2) at specific depths into an injection or recovery well for well maintenance to physically break up the precipitate that builds up on the well casing and in the screened interval during rinsing activities. The application of liquid CO2 shall be under the force of gravity into the open well casing without pressure confinement.

F. MONITORING PROGRAM

1. Groundwater Quality Monitoring Wells.

The monitoring wells required by EPA shall serve as groundwater quality monitoring wells for the federal UIC Permit established herein. The proposed POC, USDW monitoring, and fault monitoring well locations are depicted in Figure A-17 and listed in Table D-7.1, Appendix A and E. The two future monitoring well clusters shall be installed and active prior to year nine of commercial ISCR operations. Each cluster has one UBFU, one LBFU and an oxide well. In addition, the twenty-nine (29) POC wells and any replacement wells initially established by Arizona Department of Environmental Quality's (ADEQ) final Aquifer Protection Permit for the ISCR operations, will also serve as groundwater quality monitoring wells for this UIC Permit. The groundwater quality monitoring well designs are shown in Figures C-5, C-6, C-7, and C-8 in Appendix B.

The approximate locations of ACD demonstration monitoring wells M72-UBF and M73-LBF are shown on Figures A-17 and A-19 of Appendix A. M72-UBF and M73-LBF locations as depicted may be moved as described in the proposed ACD demonstration Section C.2.5.2 of Appendix B and subject to EPA review and approval. After the completion of the ACD demonstration, the ACD test wells (M72-UBF and M73-LBF) shall be incorporated into the established Level 1 monitoring program consistent with the fault and USDW monitoring. Monitoring of the ACD test wells shall cease when the wells within the initial resource block are plugged and abandoned.

If the ACD demonstration results described in Section C.2.5.2 of Appendix B are inconclusive, the Permittee shall install contingency monitoring wells in each resource block overlying the Bedrock Oxide Zone in the LBFU and UBFU as depicted in Figure C-4b and C-4c and described in Section C.2.5.3 in Appendix B. The proposed activation schedule and locations may change with ISCR wellfield

development and operational performance subject to later revision and EPA review and approval. ACD contingency monitoring wells shall be monitored consistent with the fault and USDW monitoring. Monitoring of the ACD contingency monitoring wells in each resource block will cease when the injection and recovery wells within the resource block are plugged and abandoned.

2. Level 1 and Level 2 Parameters, Alert Levels, and Aquifer Quality Limits

   a. Level 1 Parameters: Level 1 analytes include constituents of ISCR solutions that are most likely to provide an early indication of groundwater impacts associated with the operation of the solvent extraction/electrowinning (SX/EW) plant and ISCR wells. Level l analytes shown in Table 1 below shall be sampled at least quarterly from each POC and monitoring well in accordance with the schedule described in Section II.F.4 of this Permit. Refer to Tables 13 and 13.1 in Exhibit D-7 in Appendix J for complete details.

   b. Level 2 Parameters: Level 2 analytes include probable constituents of the ISCR solutions for which primary MCLs have been established pursuant to 40 CFR Part 141 and other constituents which are likely to appear in greater concentrations in groundwater impacted by ISCR solutions than in non-impacted groundwater. Level 2 analytes shown in Table 2 below shall be sampled at least once annually from each POC and monitoring well in accordance with the schedule described in Section II.F.4 of this Permit. Refer to Tables 14 and 14.1 in Exhibit D-7 in Appendix J for complete details.

   c. Alert Levels (ALs): With the exception of the field parameters which will not be assigned ALs (except for pH), the Permittee shall establish ALs for Level l and Level 2 analytes subject to review and approval by EPA, as described in Exhibit D-7: Alert Levels in Appendix J of this Permit. Where any conflict or inconsistency exists between this Exhibit and the permit conditions, the permit condition shall supersede the language in the Exhibit.

   d. Aquifer Quality Limits (AQLs): The Permittee shall establish AQLs for parameters with primary MCLs pursuant to 40 CFR Part 141, as follows:

      i. If the calculated AL is less than the MCL, then the AQL shall be set equal to the MCL.

      ii. If the calculated AL is greater than the MCL, then the AQL shall be set equal to the AL.

Table 1: Water Quality Parameters - Level 1

Parameter (mg/L unless noted)	AQL	AL
Fluoride	TBD	TBD
Magnesium	NA	TBD
Sulfate	NA	TBD
Total Dissolved Solids	NA	TBD
pH, units (field)	NA	TBD
Specific Conductance, micromhos/cm (field)	NA	NA
Temperature, deg F or deg C	NA	NA

Note: The Permittee shall utilize the applicable analytical methods described in Table I of 40 CFR §136.3, or in Appendix III of 40 CFR Part 261, or in certain circumstances, other methods that have been approved by the EPA Administrator.

AQL - Aquifer Quality Limit (as defined at Section II.F.2.d)
AL - Alert Level (as defined at Section II.F.2.c)
TBD - To be determined and approved by EPA for all POC wells and the monitoring wells required by EPA prior to the commencement of injection.
NA - Not applicable: Shall be measured and reported but no AL or AQL shall be established.

Table 2: Water Quality Parameters - Level 2

Parameter	AQL	AL
Common Ions (mg/L unless noted)		
pH (lab)	NA	NA
Bicarbonate	NA	NA
Calcium	NA	NA
Carbonate	NA	NA
Chloride	NA	NA
Nitrate-N[1]	TBD	TBD
Nitrite-N	TBD	TBD
Potassium	NA	NA
Sodium	NA	NA
Cation/Anion balance	NA	NA
Formation-Related Metals (mg/L)		
Aluminum	NA	TBD
Antimony	TBD	TBD
Arsenic	TBD	TBD
Barium	TBD	TBD
Beryllium	TBD	TBD
Cadmium	TBD	TBD
Chromium (Total)	TBD	TBD

Parameter	AQL	AL
Cobalt	NA	TBD
Copper	TBD	TBD
Iron	NA	TBD
Lead	TBD	TBD
Manganese	NA	TBD
Mercury (inorganic)	TBD	TBD
Nickel	NA	TBD
Selenium	TBD	TBD
Thallium	TBD	TBD
Zinc	NA	TBD
Formation-Related Radioactive Chemicals		
(pCi/L)		
Gross Alpha	TBD	TBD
Adjusted Alpha [2,3]	TBD	TBD
Gross Beta	TBD	TBD
Radium 226 and Radium 228 (combined)[2]	TBD	TBD
Radon	NA	TBD
Uranium isotopes[2]	NA	NA
Uranium (Total), micrograms/L	NA	TBD
Process-Related Organics[4]		
(mg/L)		
Total petroleum hydrocarbons-diesel	NA	TBD
Benzene	TBD	TBD
Ethyl benzene	TBD	TBD
Toluene	TBD	TBD
Total Xylene	TBD	TBD
Napthalene	TBD	TBD
Octane	TBD	TBD

Note: The Permittee shall utilize the applicable analytical methods described in Table I of 40 CFR §136.3, or in Appendix Ill of 40 CFR Part 261, or in certain circumstances, other methods that have been approved by the EPA Administrator.

AQL - Aquifer Quality Limit
AL - Alert Level
TBD - To be determined and approved by EPA for all POC wells and the monitoring wells required by EPA prior to the commencement of injection.
NA - Not applicable: Shall be measured and reported but no AL or AQL shall be established.

[1] Nitrate will be used only for calculation of cation/anion balance because of regional nitrate pollution and no nitrate used in processes.
[2] These parameters are to be analyzed only if the concentration of Gross Alpha Particle Activity exceeds the parameter's AL or AQL.
[3] Adjusted gross alpha includes radium-226 but excludes radon-222 and total uranium.
[4] Any organic compound not listed above shall be so listed if an MCL has been established for that organic compound and if the organic compound is detected in the injectate.

3. Baseline Data and Statistical Methods

Prior to the commencement of injection, the Permittee shall:

a. Collect baseline water quality samples for all Level l and Level 2 parameters such that accepted statistical methods can be applied to assign ALs and AQLs at all POC and monitoring wells. For Process-Related Organics (Level 2), two (2) months of data collection that demonstrate no detection of organic parameters will be sufficient for background characterization.

b. Submit to EPA mean baseline concentrations, standard deviations, ALs, federal AQLs, based on statistical methods used to establish ALs and AQLs, as described in Exhibit D-7 in Appendix J of this Permit, or based on other methods approved by EPA, which:

i. establishes a means of verifying whether or not USDWs are endangered during recovery operations, rinsing, closure, and post-closure, and

ii. establishes specific points at which contingency plans are activated.

c. Receive written approval from EPA for the baseline data, action levels, and statistical approach defined at (b), above.

4. Groundwater Quality Monitoring Schedule

All POC wells and other monitoring wells shall comply with the following monitoring schedule for up to 24 years of ISCR operations and restoration and the minimum five (5)-year final post-closure period:

Table 3. Monitoring Schedule for the POC and Monitoring Wells during the ISCR Operations and Final Post-Closure Period

Time Period	Water Quality Parameters	Sampling Frequency
ISCR Operations	Level 1	At least once per quarter
	Level 2	At least once every twelve months
Final Post-Closure	Level 1	At least once per quarter for the first two years after closure and then at least once every twelve months
	Level 2	At least once every twelve months
Note: Level 1 and Level 2 Water Quality Parameters are defined at Part II, Section F.2 in Table 1 and Table 2, respectively.		

Note: The Quarterly Compliance Monitoring Tables (Level 1 parameters) for each POC and monitoring well are presented in Tables 13 and 13.1 and the Annual and Contingency Monitoring Tables (Level 2 parameters) for each POC and monitoring well are presented in Tables 14 and 14.1 in Appendix J of this Permit. Refer to Tables 13, 13.1, 14, and 14.1 for water quality monitoring well schedules.

5. Hydraulic Control Monitoring Wells

External monitoring of the ISCR process around the perimeter of the ISCR wellfield shall be conducted to verify hydraulic control. This monitoring of the oxide zone shall be performed using recovery or perimeter wells compared to observation wells at the perimeter of the active portion of the wellfield. The average water levels in the oxide POC wells will also be monitored on a daily basis and compared to the levels in the observation and recovery/perimeter wells to verify hydraulic control within the AOR.

FCP hydraulic monitoring will entail using the perimeter or recovery wells nearest to each observation and POC well as a triplet for hydraulic head comparison and for verifying that the head gradient is inward, that is, from the observation well towards the ISCR wellfield. Head monitoring will be accomplished using pressure transducers placed in the POC, observation and perimeter wells and the nearest recovery well from which average daily head measurements will be recorded. In addition, the Permittee shall monitor specific conductance at the injection zone in the observation wells and monitor resistivity (convert to conductivity values) at the early warning ACDs for each resource block to verify that hydraulic control is maintained and to detect any excursion in accordance with the approved procedures defined in 6.a and b, below. An excursion may signal that injection interval fluids are moving out of the ISCR area. The purpose of excursion monitoring is the early detection of incipient loss of control of injection interval fluids so that control may be regained before any contamination reaches the aquifer exemption boundary.

6. Conductivity Monitoring

a. If the Permittee relies on a monitoring program to demonstrate mechanical integrity under 40 CFR §146.8(a)(2) and Section II.E.3.a.ii and to provide an indication of potential vertical migration of injected fluids, the Permittee shall monitor annular conductivity in accordance with Section C.2.5 of Appendix B of this Permit and the following requirements:

i. Prior to injection and recovery in a resource block, obtain baseline data for ACDs in each well,

ii. Submit to EPA a report describing the results of baseline measurements and proposed AL values to indicate a potential loss of mechanical integrity or hydraulic control requiring contingency actions, and submit the data to EPA for review and approval, and

iii. Measure resistivity at each ACD at least once per quarter during the life of the well and respond to any AL exceedances by completing the contingency actions listed in Section C.2.5.1 of Appendix B of this Permit.

b. Prior to commencement of injection in a resource block, the Permittee shall comply with the following specific conductance sensor monitoring requirements:

i. The Permittee shall collect baseline specific conductance measurements in observation wells to establish the range of background specific conductance levels.

ii. For the purpose of detecting any loss of hydraulic control or any excursion of injection or ISCR fluids at the perimeter of the wellfield, the Permittee shall submit to EPA a report describing the results of baseline measurements and proposed procedures for 1) identifying a statistically significant increase above statistical noise levels in specific conductance values at the observation wells, 2) confirming a loss of hydraulic control, and 3) addressing a possible excursion requiring contingency actions.

iii. Receive written approval from EPA for the baseline data, proposed action levels, and proposed statistical analysis procedures above.

c. During ISCR and rinsing operations, the Permittee shall monitor specific conductance in observation wells on a daily basis and implement approved procedures described at b. above.

d. During initial ISCR operations, the Permittee shall perform a demonstration of ACD response to the detection of ISCR fluid movement adjacent to injection wells in the first resource block to be activated as described in Section C.2.5.2 of Appendix B. Prior to the commencement of injection, the Permittee shall collect baseline water quality samples from each of the ACD demonstration monitoring wells (M72-UBF and M73-LBF) and down gradient observation wells to be used in the ACD demonstration to establish the range of background levels.

At the commencement of ISCR operations, injected fluid is anticipated to advance to the location of the sacrificial ACDs within the authorized injection zone. The Permittee will collect resistivity data monthly from each of the sacrificial ACDs installed on the injection wells selected for ACD demonstration. The Permittee will collect water quality samples monthly from each of the ACD demonstration monitoring wells (M72-UBF and M73-LBF) and down gradient observation wells from the time that injection begins until the demonstration is completed at approximately month six. Samples will be analyzed for the water quality parameters listed in the monitoring Table 1 in Section F.2.d above.

Approximately six months after injection begins at the first resource block to be activated, the Permittee will perform statistical analysis of the sacrificial ACD readings to identify statistically significant changes from baseline values. Within 30 days of completion, the Permittee shall submit to EPA a report describing the results of baseline measurements, data collected, and statistical analysis of the ACD Demonstration for EPA review and approval.

7. Injectate Solution Monitoring

The Permittee shall comply with the following injectate solution monitoring requirements:

a. At least once per month, the Permittee shall measure the pH and the total concentration of total petroleum hydrocarbons (TPH)-diesel, benzene, toluene, ethylbenzene, xylenes (total), napthalene, and octane in the injectate solution using applicable analytical methods described in Table I of 40 CFR §136.3, in USEPA SW-846, Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods, unless other methods have been approved by EPA.

b. The Permittee shall modify the list of organic constituents required under the injectate solution monitoring program defined at (a), above, if the Permittee has received written approval from EPA for a change in the injectate solution, as detailed at Section II.E.6 of this Permit, and the list

described at (a), above, which does not include all organic constituents which are present or could be present in the raffinate pond.

c. The Permittee shall measure inorganic constituents in the injectate solution at least once per month using applicable analytical methods described in Table I of 40 CFR §136.3, in USEPA SW-846 unless other methods have been approved by EPA. The inorganic analytes to be measured shall include all constituents listed in Table 1, Column 3 in Appendix E of this Permit, plus molybdenum, strontium, and thorium.

d. The Permittee shall modify the list of inorganic constituents described in (c) above in accordance with the requirements of Section II.E.6.

8. Groundwater Elevation Monitoring

Groundwater depths and elevations, measured in feet relative to mean sea level (msl) of the oxide zone in POC, monitoring, observation, and recovery/perimeter wells used for monitoring hydraulic gradient shall be measured on a quarterly basis and reported in accordance with Section II.G.2.e of this Permit.

9. Monitoring Information

Records of monitoring activity required under this Permit shall include:

a. Date, exact location, and time of sampling or field measurements;

b. Name(s) of individual(s) who performed sampling or measurement;

c. Exact sampling or measurement method used;

d. Date(s) laboratory analyses were performed;

e. Name(s) of individual(s) who performed laboratory analyses;

f. Types of analyses; and

g. Results of analyses and measurements.

10. Monitoring Devices

a. Continuous monitoring devices

Temperature and injection pressure shall be measured at the wellhead of all injection wells using equipment of sufficient precision and accuracy, as described below. All well measurements must be recorded at minimum to a resolution of one tenth of the unit of measure, except temperature (e.g.,

injection and production rates and volumes must be recorded to a resolution of a tenth of a gallon; pressure must be recorded to a resolution of a tenth of a psi gauge (psig); injection fluid temperature must be recorded to a resolution of one degree Fahrenheit). Exact dates and times of measurements, when taken, must be recorded and submitted. Injection and production rates shall be measured at or near the wellhead. The Permittee shall continuously monitor and shall record the following parameters at the prescribed frequency:

Parameters	**Frequency**	**Instrument**
Injection rate (gpm)	continuous	digital recorder
Daily injection volume (gallons)	Daily	digital totalizer
Total cumulative injection volume (gallons)	continuous	digital totalizer
Injection pressure (psig)	Daily	digital recorder
Injection fluid temperature (degrees Fahrenheit)	Daily	digital recorder
Production rate (gpm)	continuous	digital recorder
Daily produced fluid volume (gallons)	Daily	digital totalizer
Total cumulative produced fluid volume (gallons)	continuous	digital totalizer
Produced fluid temperature (degrees Fahrenheit)	Daily	digital recorder

b. Calibration and Maintenance of Equipment

All monitoring and recording equipment shall be calibrated and maintained on a regular basis to ensure proper working order.

G. RECORDKEEPING AND REPORTING

1. Recordkeeping

The Permittee shall retain the following records and have them available at all times for examination by an EPA inspector:

a. All monitoring information, including required observations, calibration and maintenance records, recordings for continuous monitoring instrumentation, copies of all reports required by this Permit, and records of all data used to complete the Permit application;

b. Information on the physical nature and chemical composition of all injected fluids;

c. Records and results of MITs, any other tests required by EPA, and any well workovers completed.

d. The Permittee shall maintain copies (or originals) of all records described in paragraphs (a) through (c) above during the operating life of the well and shall make such records available at all times for inspection at the facility.

e. The Permittee shall only discard the records described in paragraphs (a) through (c) if:

i. The records are either delivered to the EPA Region 9 Groundwater Protection Section, or

ii. Written approval from the Regional Administrator to discard the records is obtained.

2. Reporting of Results

The Permittee shall submit accurate quarterly reports in accordance with the required schedule below to EPA containing, at minimum, the following information:

a. A map showing the current FCP operational status and groundwater elevation contours based on the current quarterly monitoring data.

b. A table and graph showing daily cumulative injection volumes and recovery volumes and the daily percent recovery to injection volume for the ISCR and rinsing operations over the reporting period. The record shall identify any 24-hour periods that the volume recovered is less than the minimum percent of volume injected and any contingency actions taken during the reporting period.

c. A graphical representation that a continuous inward hydraulic gradient was maintained using water level elevations in the ISCR well field. A table and graphical presentation of daily average head comparisons for each well pair (observation and recovery/perimeter wells) and well triplet (observation, recovery/perimeter and POC wells) used to monitor the hydraulic gradient. The record shall also include a figure showing the location and identity of each of the wells.

d. A table and graph showing results of the specific conductance measurements and depth in the observation wells compared to the established background and action levels identifying any statistically significant increase above statistical noise levels in specific conductance

values. The record shall also include a discussion of any increase that occurred, an evaluation of whether an excursion has occurred, and mitigating action taken during the reporting period.

e. A table showing groundwater depths and elevations, analytical results, AQLs, and ALs along with a summary narrative, and ACD data, plus a graphical presentation of those results since inception of monitoring compared to the current reporting quarter. The records should also include a discussion of any exceedances that occurred and mitigation actions taken during the reporting period.

f. Results of monthly analyses of organics in the injectate.

g. Results of monitoring required at Section II.F.7 (pursuant to 40 CFR §146.33(b)(l)) whenever the injection fluid is modified to the extent that previously reported analyses are incorrect or incomplete.

h. Results of mechanical integrity tests conducted during the reporting period.

i. Analytical results of monthly sampling and analysis of the treated water used for formation rinsing for pollutants to document that the water quality meets the requirements described in Section II.E.6.e of this Permit.

j. Results of ACD monitoring in the injection, recovery, observation, and perimeter wells to demonstrate mechanical integrity for the current quarter.

k. Results of ACD monitoring at the LBFU/bedrock oxide contact in injection wells for demonstration of hydraulic control and protection of the LBFU and UBFU from vertical ISCR fluid movement during the reporting period.

l. A summary of the any plugging and abandonment activity conducted during the reporting period.

m. A summary of rinsing and closure operations conducted during the reporting period and analysis of aquifer restoration results.

n. A table showing the average, maximum, and minimum on a monthly basis of the tubing/casing annulus and injection pressures.

o. Description of changes and updated figures of the wellfield configuration and planned wellfield development sequence of operational units for the coming year on an annual basis. Include the status of each resource block including whether it is planned, under construction, constructed,

operational, rinsing, or closed. Include a plan view layout of planned wells for the coming year, and identify Rinse Verification Wells within rinsing or closed resource blocks proposed for monitoring.

3. Quarterly reports shall be submitted by the dates listed below:

Reporting Period	**Report Due**
Jan, Feb, Mar	Apr 28
Apr, May, June	Jul 28
July, Aug, Sept	Oct 28
Oct, Nov, Dec	Jan 28

4. Copies of All reports

Copies of all reports of FCP formation testing and geophysical well logging conducted prior to beginning ISCR operations in operational units of a resource block shall be submitted to EPA and reviewed and approved by EPA before commencement of ISCR operations is authorized in the operational units of a resource block.

5. PTF Well Field Rinsing Demonstration Report

PTF Well Field Rinsing Demonstration Report shall be submitted and approved by EPA prior to re-commencing injection for copper recovery at the PTF well field under this Permit if not already submitted to EPA under the prior UIC Permit and prior to authorization to inject in the first ISCR resource block.

6. Copies of All Reports

Copies of the monitoring results, all reports and other information required by this Permit shall be submitted to the following address:

U.S. Environmental Protection Agency, Region 9
Groundwater Protection Section (WTR-4-2)
75 Hawthorne St.
San Francisco, CA 94105-3901

The Permittee shall also submit electronic copies to the Manager of the Groundwater Protection Section, U.S. EPA Region 9.

7. Public Website.

Within thirty (30) days after this Permit becomes effective, the Permittee shall establish a website or portal for the Project accessible to the general public (the "Website") and shall provide to EPA the Website IP address. EPA will share the IP address of the Website with the public on EPA's website. The Permittee shall post

on the Website copies of all quarterly reports, and the Groundwater Flow Model Reports, that are submitted to EPA by the Permittee, including appendices and exhibits within 30 days of submission to EPA. If the Permittee provides additional technical information supplementing, clarifying, or modifying a report to EPA, the Permittee shall also make electronic copies of such technical information available on the Website within 30 days of submitting it to EPA.

H. CONTINGENCY PLANS

1. Loss of Hydraulic Control

   a. The Permittee shall initiate the following actions within 24 hours of becoming aware that the volume of fluids recovered from the injection and recovery zone of the ISCR wellfield during a 24-hour period is less than 106 percent of the amount of fluid injected during the same 24-hour period:

      i. adjust the flow rate for the recovery and/or injection wells to restore the percent of recovered fluid volume to at least 106 percent of the injected volume,

      ii. inspect the injection and recovery lines, pumps, flow meters, totalizers, pressure gages, pressure transducers and other associated instruments and facilities,

      iii. initiate pressure testing of wells if the loss of fluids cannot be determined to be caused by a surface facility failure, and

      iv. repair system as necessary to restore the percent of recovered fluid volume to at least 106 percent of the injected volume.

   b. A loss of hydraulic control is deemed to occur when the amount of fluid recovered during a 48-hour period is less than 106 percent of the amount of fluid injected during the same 48-hour period. Loss of hydraulic control is also defined by an outward gradient or by an inward gradient (in head differential) of less than one (1) foot observed over a 48-hour period in any triplet of observation, recovery/perimeter, and POC wells used to monitor the hydraulic gradient. An inward gradient of less than one foot differential (i.e., loss of hydraulic control) shall require action to restore the inward gradient to at least one foot in the subsequent 24-hour period.

      The minimum extraction to injection ratio and head differentials may be adjusted during the course of the ISCR operation if warranted by head data from observation, recovery/perimeter, and POC well triplets and from other wells, subject to EPA approval.

The Permittee shall initiate the following actions within 24 hours of becoming aware of the loss of hydraulic control within the ISCR area for more than 48 consecutive hours, as defined above. The Permittee shall:

i. cease injection in one or more wells as necessary to restore hydraulic control,

ii. operate recovery wells and perimeter wells until the amount recovered equals an amount sufficient to restore the ratio of fluid recovered to injected during the prior 72-hour period to a minimum of 106 percent and restore the observation, recovery/perimeter, and POC well triplet head differentials to at least one foot to verify an inward flow gradient,

iii. verify proper operation of all facilities within the ISCR wellfield, and

iv. perform any necessary repairs.

c. Loss of hydraulic control is also defined by a significant increase in conductivity indicated by an AL exceedance pursuant to Section II.F.6.a or b of this Permit at the observation wells, or at individual ACDs on two or more wells for detection of upward movement of ISCR fluids in the formation between wells.

d. If action is taken under either (a), (b), or (c) above, in the next quarterly report, the Permittee shall describe the causes and impacts of the loss of hydraulic control or the variance from the required recovery to injection ratio and the actions that were taken to correct the event.

2. Water Quality Exceedances at POC and other Monitoring Wells

The following describes required actions in response to an AL or AQL exceedance in a POC or other monitoring well(s) during the ISCR operations and the minimum five (5)-year Post-Closure period in each resource block:

a. AL exceedance during ISCR operations in a resource block

i. The Permittee shall collect a verification sample within five (5) days after becoming aware of an exceedance of an AL listed in Table 1 or Table 2 of Section II.F.2 of this permit.

ii. Within five (5) days after receiving the results of verification sampling from the laboratory, the Permittee shall notify EPA if the results indicate an exceedance.

iii. If the results of verification sampling indicate that an AL has not been exceeded, the Permittee shall notify EPA of the results and assume that no exceedance has occurred. No further action is required until the next scheduled monitoring round.

iv. Within ten (10) days of receiving the laboratory results verifying that an AL has been exceeded, the Permittee shall do the following:

(A) Submit a written report to EPA providing an evaluation of the cause, impacts, or mitigation of the discharge responsible for the AL exceedance, or

(B) Submit a written report to EPA which definitively demonstrates that the AL exceedance resulted from an error(s) in sampling, analysis, or statistical evaluation.

v. Upon review of the report documenting the AL exceedance, EPA may require additional monitoring and/or any actions that EPA determines are necessary to address the AL exceedance and a schedule for implementing the actions.

b. AQL Exceedance during ISCR operations, Closure, and Post-Closure period for a resource block.

i. The Permittee shall collect a verification sample within five (5) days of becoming aware of an exceedance of an AQL listed in Table 1 or Table 2 of Section II.F.2 of this Permit.

ii. Within five (5) days of receiving the results of verification sampling from the laboratory, the Permittee shall notify EPA of the results, regardless of whether the results are positive or negative.

iii. If the results of verification sampling indicate that an AQL has not been exceeded, the Permittee shall assume that no exceedance has occurred and no further action is required until the next scheduled monitoring round.

iv. Within ten (10) days of receiving the laboratory results verifying that an AQL has been exceeded, the Permittee shall do the following:

(A) Submit a written report to EPA providing an evaluation of the cause, impacts, or mitigation of the discharge responsible for the AQL exceedance, or

(B) Submit a written report to EPA which definitively demonstrates that the AQL exceedance resulted from an error(s) in sampling, analysis, or statistical evaluation.

v. Upon review of the report documenting the AQL exceedance, EPA may require additional monitoring and/or any actions that EPA determines are necessary to address the AQL exceedance and a schedule for implementing the actions.

c. Verification Sample Requirements

The verification sample shall be collected only from the well in which an exceedance was detected and shall be analyzed for all constituents of Table 1 of Section II.F.2 of this Permit. If the constituent that exceeded an AL or AQL is one that is listed in Table 2 of Section II.F.2, the verification sample shall be analyzed for all constituents listed in Table 1 and only for constituent(s) from Table 2 that exceed the AL or AQL.

I. RESTORATION and PLUGGING & ABANDONMENT

Pursuant to 40 CFR §§ 146.10 and 144.12, the Permittee shall comply with the Closure and Post-Closure Plan in Appendix F including the aquifer rinsing and restoration plan in Attachment 16 of Appendix F and the Plugging and Abandonment Plan in Appendix C in accordance with the schedule for aquifer restoration, ground water monitoring, and plugging and abandonment activities to ensure adequate protection of USDWs. The Permittee shall comply with the conditions at I.1 and I.2 below. Where any conflict or inconsistency exists between the above Plans and permit conditions, the permit condition shall supersede the language in the Plan.

The Permittee will close resource blocks as leaching is progressively completed during active ISCR operations. Rinsing will be conducted in the same sequence in which the wells are taken out of service for closure, subject to the availability of a sufficient number of wells to effectively rinse the mined area in the resource block. The planned sequence of rinsing is shown on Figure A-18, Attachment A of this Permit.

During the life of the Project, there will be periods of time when rinsing is ongoing in areas that are proximal to active copper recovery operations. In these instances, the Permittee will continue to maintain hydraulic control at the perimeter of the active ISCR wellfield, including both the areas undergoing active copper recovery and rinsing. The Permittee will have resting zones between rinsing areas and active copper recovery areas to ensure rinsing progress is not impacted by ongoing ISCR operations. This resting zone includes the use of one or more rows of resting wells, and/or injection of fresh water, as necessary, between the active copper recovery areas and the rinsing area to provide physical and hydraulic separation between these two processes. The resting wells will be

those that are near the end of the active leaching cycle, that are periodically pumped to recover solution, and that are being prepared for inclusion in the next rinsing group.

The aggregate recovery rate will be higher than the aggregate injection rate to ensure that more fluid is withdrawn than is injected, and to maintain the necessary inward hydraulic gradient during ISCR operations and formation rinsing. The typical hydraulic control during rinsing with active leaching going on and a resting zone between the two processes is shown on Figure A-20, Attachment A of this Permit. Successful hydraulic control is indicated by the criteria established in Section II.E of this Permit.

1. Closure, Aquifer Restoration, and Plugging and Abandonment

    a. Constituents with primary MCLs: Within 60 days after completing copper recovery operations in the injection and recovery zone for a resource block, the Permittee shall commence restoration activities for the injection and recovery zone. The groundwater in the injection and recovery zone shall be restored to concentrations which are less than or equal to primary MCLs defined at 40 CFR Part 141, or to pre-operational background concentrations if the pre-operational background concentrations exceed MCLs. The Permittee shall follow the procedure detailed at (c), below.

    b. Constituents without primary MCLs: In addition to constituents with primary MCLs, the Permittee shall ensure that constituents which do not have primary MCLs do not impact USDWs in a way that could adversely affect the health of persons.

    c. Closure and Plugging & Abandonment Procedure: The Permittee will commence closure operations in the injection and recovery zone of a resource block after copper recovery operations have been completed. During closure operations, the Permittee will cease injection of lixiviant and initiate rinsing of the injection and recovery zone by injection/recovery or recovery operations while injection and recovery operations continue in other areas of the wellfield. At all times during injection and recovery zone rinsing, the Permittee shall maintain inward hydraulic gradients (i.e., maintaining hydraulic control) of the injection and recovery zone. The Permittee will monitor the rinsing progress by analyzing water recovered from well-field manifolds for sulfate concentration. When levels of sulfate in the manifolds have declined below 750 mg/L, the Permittee will sample manifold discharges for all Level 2 constituents defined at Section II.F of this Permit. If results of the Level 2 sampling show that one or more compounds are above primary MCLs and the pre-operational background concentrations, rinsing operations will continue until all compounds are below primary MCLs or the pre-operational background concentrations if pre-operational background concentratons exceed MCLs. When all primary MCLs or pre-operational background concentrations are achieved, it will serve as an

indication of acceptable closure conditions for the FCP, subject to the well sampling protocol described below. The sulfate concentration at which all primary MCLs or pre-operational background concentrations are met is referred to as the indicator sulfate concentration.

The Permittee will sample all wells in the FCP undergoing closure to determine if the sulfate concentrations are less than or greater than the indicator sulfate concentration. If the sulfate concentration in a well is below the indicator sulfate concentration, the Permittee may discontinue rinsing operations in that well until the end of the thirty (30)-day period described below. If the sulfate concentration in a well exceeds the indicator sulfate concentration, the Permittee shall continue rinsing operations until such time that the sulfate concentration in the well is less than the indicator sulfate concentration.

When all individual well concentrations within the injection and recovery zone are below the indicator sulfate concentration, hydraulic control for all wells within the injection and recovery zone will be discontinued for thirty (30) days. At the end of the thirty (30)-day period, the wells will be re-sampled and if sulfate concentrations remain below the indicator sulfate concentration in all wells, the Permittee may cease all rinsing and monitoring activities for the wells in the injection and recovery zone. The Permittee shall document the results of the closure operation in the subsequent quarterly monitoring report and notify EPA of the schedule for plugging and abandonment operations at least thirty (30) days in advance of commencing plugging and abandonment operations. The Permittee shall submit with the notification the closure report and an updated Plugging and Abandonment Plan and schedule for EPA approval. The wells shall be abandoned in accordance with the Plugging and Abandonment Plan (Appendix C) and the Closure and Post-Closure Plan in Appendix F unless modified for individual well conditions.

2. Post Rinse and Closure Monitoring:

   a. Post Rinse Monitoring for each resource block: Leaching will be completed at individual resource blocks prior to the cessation of ISCR operations. To evaluate the effectiveness of rinsing and measure any rebound effects of mining process constituents, the Permittee shall retain one ISCR well per resource block for use in verification monitoring and monitor at one month, six months and one-year increments after rinsing has ceased for Level 1 and 2 parameters in Section II.F.2 of this Permit. Data generated from each monitoring event will be promptly reviewed and the contingency plans at Section H.2.b shall be followed in the event of an exceedance of the indicator sulfate concentration or an AQL. These wells may also be used as recovery wells for additional rinsing if monitoring indicates additional rinsing is required to meet the water quality criteria set

forth above for closure. Thereafter, if one year of verification monitoring indicates that the resource block continues to meet closure criteria requirements above, the Permittee shall monitor at least once every 12 months for Level 1 and 2 parameters in Section II.F.2 of this Permit for a period of 5 years after closure of a resource block. The verification wells for each resource block will be retained for the life of the mine to assist with closure monitoring and post rinse contingency actions. The ISCR wells proposed for retention as verification wells are depicted on the Figure included in Exhibit D-8 in Appendix E of this Permit.

b. Monitoring at POC and other monitoring wells at the conclusion of ISCR operations: To ensure that the restoration required above accomplished the objective of returning the injection and recovery zone to primary MCLs or pre-operational background concentrations, the Permittee shall comply with the Post-Closure Monitoring Program Schedule at Section II.F.4 and the AQL exceedance contingency plan established in Section II.H.2.b of this Permit. The Post-Closure Monitoring Program Schedule at Section II.F.4 may be extended beyond five years if EPA deems it necessary to ensure adequate protection of USDWs. The Permittee shall submit a post-closure notification and report, with documentation, to EPA within 30 days following completion of the post-closure plan.

3. Restoration Evaluation:

The Permittee shall evaluate the success of restoration of each resource block after one year of post-rinse monitoring required in Section I.2.a. above. The Permittee shall submit a restoration report for each resource block or a group of resource blocks within six months after the one year of post-rinse monitoring that documents the impacts and long-term stability of meeting closure criteria requirements above within each resource block or group of resource blocks. The report shall include data collection and analysis, the analysis of geochemical conditions, summary of AQL exceedances, any impacts, and description of mitigation measures taken during the duration of the post-rinse monitoring. Analysis of the geochemical conditions will include geochemical modeling of the long-term equilibrium of the residual solid phase mineral constituents.

If the Permittee is not meeting closure criteria requirements for any resource block(s) undergoing rinsing or post-rinse monitoring and EPA determines that this failure to meet closure requirements may allow the movement of fluid containing any contaminant into a USDW, and that the presence of that contaminant may cause an exceedance of primary MCLs under 40 CFR part 141 or may otherwise adversely affect the health of persons, then EPA may require ceasing injection of mining solutions until the Permittee demonstrates that it is meeting the closure criteria requirements above.

J. OPERATIONAL AND POST-CLOSURE AUDITS

The hydraulic properties generated from aquifer tests in each resource block prior to commencement of ISCR operations in the block will be incorporated into the project groundwater model as part of an annual model update. As described in Section II.C.3 of this Permit, porosity values will also be updated in the model for the resource blocks in which wells were installed for the previous year if measured porosity values differ from those used in the model. Following the update, the model will be run to test the effects of the update on model calibration. The groundwater flow model shall assess the performance of hydraulic control of operating resource blocks based on monitoring data, rinsing of resource blocks, and any adjustments to the post-closure monitoring period based on updated groundwater flow modeling results. The Permittee shall submit an annual groundwater flow model evaluation and updated report describing how representative the results are to actual hydraulic conditions.

The Permittee shall also verify that the pollutant fate and transport are behaving as predicted. During the third (3rd), fifth (5th), seventh (7th) tenth (10th), fifteenth (15th), twentieth (20th), twenty-fifth (25^{th}) years after the commencement of FCP operations, or as otherwise directed by EPA, the Permittee shall conduct a post-closure audit of the modeling which predicted the fate and transport of pollutants discharged by FCP's closed operations. For each audit, the Permittee shall submit a report to EPA describing the post-closure audit as well as any changes in the conceptual model, any model redesign, and any changes in predicted post-closure conditions.

K. DURATION OF PERMIT

This Class III Permit is issued for the life of the Florence Copper ISCR project. This includes the period of well construction, corrective action, and demonstrations required prior to injection under permit conditions in Part II, Sections C, D and E.2. After injection is authorized, this Class III Permit authorizes 1) up to a 24-year operational and closure period and 2) a minimum five (5) year post-closure monitoring period; unless the Permit is terminated under the conditions set forth in Part III, Section B.1. The duration of this Class III Permit shall include any post-closure monitoring required beyond five (5) years.

L. FINANCIAL RESPONSIBILITY

1. Demonstration of Financial Responsibility

   The Permittee is required to demonstrate and maintain financial responsibility and resources sufficient to meet the restoration and plugging and abandonment requirements established at Part II, Section I of this Permit and described in the Plugging and Abandonment Plan (Appendix C) and the Closure and Post Closure Plan (Appendix F) and consistent with 40 CFR §144.52(a)(7) and Subpart F, which the Director has chosen to apply.

a. The Permittee shall post an approved financial instrument such as a surety bond or other financial assurance in the amount of $31,357,250 to guarantee aquifer restoration, ground water monitoring, and plugging and abandonment activities for closure and post-closure. Authority to construct, inject and operate the wells under the authority of this Permit will be granted only after the financial instrument has been posted and approved by EPA. Detailed closure and post-closure cost estimates for the ISCR facility are provided in Tables F-1 and F-2, which is included in Appendix C.

b. The level and mechanism of financial responsibility shall be reviewed and updated periodically, upon request of EPA. The Permittee may be required to change to an alternate method of demonstrating financial responsibility. Any such change must be approved in writing by EPA prior to the change.

c. EPA may require the Permittee to estimate and to update the estimated restoration, plugging, and/or post-closure activity costs periodically. Such estimates shall be based upon costs that a third party would incur to carry out the required restoration activities, properly plug and abandon the wells, and conduct post-closure monitoring activities; these costs include materials, equipment, mud and disposal costs, and labor with appropriate contingencies.

2. Insolvency of Financial Institution

The Permittee must submit an alternate instrument of financial responsibility acceptable to EPA within sixty (60) days after either of the following events occurs:

a. The institution issuing any bond or other financial instrument that is secured to demonstrate financial responsibility in accordance with Section II.L.1. of this Permit files for bankruptcy; or

b. The authority of the trustee institution to act as trustee, or the authority of the institution issuing the financial instrument, is suspended or revoked.

Failure to submit an acceptable financial demonstration may result in the termination of this Permit pursuant to 40 CFR §144.40(a) (1).

3. Insolvency of Owner or Operator

An owner or operator must notify EPA by certified mail of the commencement of voluntary or involuntary proceedings under U.S. Code Title 11 (Bankruptcy), naming the owner or operator as debtor, within ten (10) business days. A guarantor of a corporate guarantee must make such a notification if he/she is named as debtor, as required under the terms of the guarantee.

M. NATIONAL HISTORIC PRESERVATION ACT

EPA considered the potential effects of this Permit on historic properties eligible for inclusion in the National Register of Historic Places in compliance with the Section 106 process of the National Historic Preservation Act (NHPA) and its implementing regulations, 36 CFR Part 800. EPA determined that the undertaking has the potential to cause adverse effects on historic properties, subject to the criteria in 36 CFR §800.5(a). The Permittee shall carry out stipulations as agreed to in the attached project Programmatic Agreement (PA) in Appendix G and shall implement the associated Historic Properties Treatment Plan (HPTP) in order to resolve any adverse effects on historic properties from the FCP.

PART III. GENERAL PERMIT CONDITIONS.

A. EFFECT OF PERMIT

The Permittee is allowed to engage in underground injection well construction and operation in accordance with the conditions of this Permit. The Permittee shall not construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity in a manner that allows the movement of fluid containing any contaminant (as defined by 40 CFR §144.3 and 146.3) into USDWs (as defined 40 CFR §§144.3 and 146.3).

Any underground injection activity not specifically authorized in this Permit is prohibited. The Permittee must comply with all applicable provisions of the Safe Drinking Water Act (SDWA) and 40 CFR Parts 124, 144, 145, and 146. Such compliance does not constitute a defense to any action brought under Section 1431 of the SDWA, 42 U.S.C. §300(i), or any other common law, statute, or regulation other than Part C of the SDWA. Issuance of this Permit does not convey property rights of any sort or any exclusive privilege, nor does it authorize any injury to persons or property, any invasion of other private rights, or any infringement of State or local law or regulations. Nothing in this Permit shall be construed to relieve the Permittee of any duties under all applicable laws and regulations.

B. PERMIT ACTIONS

1. Modification, Revocation and Reissuance, or Termination

   EPA may, for cause or upon request from the Permittee, modify, revoke and reissue, or terminate this Permit in accordance with 40 CFR §§124.5, 144.12, 144.39, and 144.40. The Permit is also subject to minor modifications for causes as specified in 40 CFR §144.41. The filing of a request for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or

anticipated noncompliance by the Permittee, does not stay the applicability or enforceability of any permit condition. EPA may also modify, revoke and reissue, or terminate this Permit in accordance with any amendments to the SDWA if the amendments have applicability to this Permit.

2. Transfers

This Permit is not transferable to any person unless notice is first provided to EPA and the Permittee complies with requirements of 40 CFR §144.38. EPA may require modification or revocation and reissuance of the Permit to change the name of the Permittee and incorporate such other requirements as may be necessary under the SDWA.

C. SEVERABILITY

The provisions of this Permit are severable, and if any provision of this Permit or the application of any provision of this Permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this Permit shall not be affected thereby.

D. CONFIDENTIALITY

In accordance with 40 CFR §§2 and 144.5, any information submitted to EPA pursuant to this Permit may be claimed as confidential by the submitter. Any such claim must be asserted at the time of submission by stamping the words "confidential business information" on each page containing such information. If no claim is made at the time of submission, EPA may make the information available to the public without further notice. If a claim is asserted, the validity of the claim will be assessed in accordance with the procedures contained in 40 CFR §2 (Public Information). Claims of confidentiality for the following information will be denied:

1. Name and address of the Permittee, or

2. Information dealing with the existence, absence, or level of contaminants in drinking water.

E. GENERAL DUTIES AND REQUIREMENTS

1. Duty to Comply

The Permittee shall comply with all applicable UIC Program regulations and conditions of this Permit, except to the extent and for the duration such noncompliance is authorized by an emergency Permit issued in accordance with 40 CFR §144.34. Any permit noncompliance constitutes a violation of the SDWA and is grounds for enforcement action, permit termination, revocation and reissuance, modification, or for denial of a permit renewal application. Such noncompliance

may also be grounds for enforcement action under the Resource Conservation and Recovery Act (RCRA).

2. Penalties for Violations of Permit Conditions

Any person who violates a permit requirement is subject to civil penalties, fines, and other enforcement action under the SDWA and may also be subject to enforcement actions pursuant to RCRA. Any person who willfully violates permit conditions may be subject to criminal prosecution.

3. Need to Halt or Reduce Activity not a Defense

It shall not be a defense, for the Permittee in an enforcement action, that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Permit.

4. Duty to Mitigate

The Permittee shall take all reasonable steps to minimize and correct any adverse impact on the environment resulting from noncompliance with this Permit.

5. Proper Operation and Maintenance

The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this Permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this Permit.

6. Property Rights

This Permit does not convey any property rights of any sort, or any exclusive privilege.

7. Duty to Provide Information

The Permittee shall furnish to EPA, within a time specified, any information which EPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Permit, or to determine compliance with this Permit. The Permittee shall also furnish to EPA, upon request, copies of records required to be kept by this Permit.

8. Inspection and Entry

The Permittee shall allow EPA, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

a. Enter upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this Permit;

b. Have access to and copy, at reasonable times, any records that are kept under the conditions of this Permit;

c. Inspect and photograph at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Permit; and

d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the SDWA, any substances or parameters at any location.

9. Signatory Requirements

All applications, reports, or other information submitted to EPA shall be signed and certified by a responsible corporate officer or duly authorized representative according to 40 CFR §144.32.

10. Additional Reporting Requirements

a. Planned Changes - The Permittee shall give notice to EPA as soon as possible of any planned physical alterations or additions to the permitted facility affecting any of the terms and conditions of the Permit.

b. Anticipated Noncompliance - The Permittee shall give advance notice to EPA of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

c. Compliance Schedules - Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this Permit shall be submitted to EPA no later than thirty (30) days following each schedule date.

d. Twenty-four Hour Reporting.

i. The Permittee shall report to EPA any noncompliance which may endanger health or the environment. The following information

shall be provided orally within 24 hours from the time the Permittee becomes aware of the circumstances.

(A) Any monitoring or other information which indicates that any contaminant may cause an endangerment to an underground source of drinking water; and

(B) Any noncompliance with a permit condition, malfunction of the injection system, or loss of mechanical integrity, which may cause fluid migration into or between USDWs.

ii. A written submission of all noncompliance as described in paragraph (i) shall also be provided to EPA within five (5) days of the time the Permittee becomes aware of the circumstances. The written submission shall contain: a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times; if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

e. Other Noncompliance - At the time monitoring reports are submitted, the Permittee shall report in writing all other instances of noncompliance not otherwise reported. The Permittee shall submit the information listed in Part III, Section E.10.d of this Permit.

f. Other Information - If the Permittee becomes aware that it failed to submit all relevant facts in the Permit application, or submitted incorrect information in the Permit application or in any report to EPA, the Permittee shall submit such facts or information within two (2) weeks of the time such facts or information becomes known.

11. Continuation of Expiring Permit

a. Duty to Reapply - If EPA requires the Permittee to continue an activity regulated by this Permit past the expiration date of this Permit, the Permittee must submit a complete application for a new Permit at least one hundred and eighty (180) days before this Permit expires.

b. Permit Extensions - The conditions and requirements of an expired Permit continue in force and effect in accordance with 5 U.S.C. §558(c) until the effective date of a new Permit, if:

i. The Permittee has submitted a timely and complete application for a new Permit; and

ii. EPA, through no fault of the Permittee, does not issue a new Permit with an effective date on or before the expiration date of the previous Permit.