FLORENCE COPPER, INC.

UIC PERMIT APPLICATION

FLORENCE COPPER PROJECT – PRODUCTION TEST FACILITY

ATTACHMENT I – FORMATION TESTING PROGRAM

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List of Exhibits

I.1 Introduction

This Attachment has been prepared in support of an Application by Florence Copper, Inc. (Florence Copper) to the United States Environmental Protection Agency (USEPA) for issuance of an Underground Injection Control Class III (Area) Permit (UIC Permit) for the planned Production Test Facility (PTF), to be located at the Florence Copper Project (FCP) site in Pinal County, Arizona. Florence Copper is proposing to develop the PTF in order to demonstrate the feasibility of operating an in-situ copper recovery (ISCR) facility at the FCP site. The PTF will produce a limited amount of copper from a porphyry copper oxide deposit (oxide zone) located beneath the FCP site. The PTF proposed by Florence Copper will consist of a closely spaced array of Class III injection and recovery wells that will inject a dilute sulfuric acid based solution (lixiviant) into the copper oxide deposit (oxide zone) and recover the resulting copper-bearing pregnant leach solution (PLS).

Previous owners of the FCP site have included Continental Oil Company, Magma Copper Company, BHP Copper Inc. (BHP Copper), and Florence Copper. These previous owners have conducted extensive and thorough studies over a period spanning the last 40 years. Studies have included exploratory drilling and testing, pilot-scale underground mining and copper production, ISCR pre-feasibility and feasibility studies, and characterization of the FCP oxide zone and local aquifers.

In this Attachment, Florence Copper provides a summary of the formation testing work completed by others. Given the extensive body of high quality characterization data produced at the FCP site, Florence Copper does not propose to conduct new formation testing. Exhibit I-1 is a site characterization report prepared in 1996 in support of Aquifer Protection Permit (APP) and UIC Permit applications submitted at that time.

I.2 Background

In 1996, BHP Copper compiled data from studies conducted by BHP Copper and others from 1970 through 1995, in support of applications to the Arizona Department of Environmental Quality (ADEQ) for an Aquifer Protection Program Permit (1996 Application), and to the USEPA for a UIC Permit. The studies included extensive field investigations and laboratory studies for the purpose of characterizing the FCP oxide zone, aquifers, formation fluids, and other aspects of the FCP site. The extent of the studies and analyses conducted are listed in the next section and described in detail in Exhibit I-1.

In 1997, ADEQ and USEPA issued APP No. 101704 and UIC Permit No. AZ396000001, respectively, authorizing BHP Copper to operate a commercial-scale copper recovery operation at the FCP site using the ISCR method. In 1997 and 1998, and as required by USEPA in Part II.F.7 of UIC Permit No. AZ396000001, BHP Copper conducted a short-term injection and recovery test to demonstrate that hydraulic control could be maintained within the injection and recovery zone while fluids were being injected and recovered during ISCR operations. The successful completion of the test was reported to ADEQ in a letter dated April 6, 1998 (BHP Copper, 1998). Although fully permitted by ADEQ and USEPA, a combination of financial considerations prevented BHP Copper from advancing the FCP to commercial-scale copper production. The FCP was subsequently sold, and the UIC Permit transferred with amendments, to the subsequent owner.

Beginning the fourth quarter of 1997, BHP Copper began quarterly and biennial water quality monitoring programs in accordance with the requirements of the APP and the UIC Permit. Monitoring and quarterly reporting have continued since that time, except for 2009 due to a previous owner's financial difficulties.

No significant formation characterization activities have been conducted at the FCP site since successful completion of the BHP Copper hydraulic control test completed in early 1998. Given the extensive dataset generated by previous site owners, and the thorough nature of studies conducted previously at the site, Florence Copper does not plan to conduct any additional formation or aquifer testing prior to construction of the proposed PTF.

I.3 Description of Formation Testing Program Conducted to Date

The methods and results of the formation testing program were compiled by BHP Copper in 1996 (Exhibit I-1). Because no additional significant formation characterization activities have been conducted since 1996, Exhibit I-1 represents the most comprehensive collection of formation testing data available. Exhibit I-1 was submitted by BHP Copper as Volume II – Site Characterization Report of their 1996 Application.

Specifically, the Site Characterization Report summarizes:

- A review of data from publicly available documents. This information includes professional journal articles, government agency publications, Arizona Department of Water Resources (ADWR) well records, and mapping of the regional bedrock.
- Documentation of communications with the Towns of Florence and Coolidge in regards to municipal well locations, pumping rates, and water quality.
- A review of pumping records retained by the San Carlos Irrigation Project (SCIP) and San Carlos Irrigation and Drainage District (SCIDD).
- An assessment of bedrock properties, including fracture frequency and orientation, based on lithologic logs of approximately 700 core holes drilled at, or in the vicinity of, the FCP site.
- The drilling of 52 boreholes by mud rotary and reverse circulation methods to depths ranging from approximately 240 to 1,580 feet below ground surface (bgs).
- The geophysical logging of about 16,340 linear feet of rotary boreholes utilizing nuclear, acoustic, and electrical methods.
- The completion of 18 observation wells in six clusters in and around the designated oxide zone to depths ranging from 240 to 1,580 feet bgs.
- Results from a monthly sampling and water quality testing program, including a total of 98 water quality parameters measured.
- Fourteen hydraulic packer tests conducted in open boreholes.
- Results from monthly water level measurements in approximately 110 wells.
- Results from 26 aquifer tests using 14 test wells and four observation well clusters, measuring up to 15 observation wells during drawdown and recovery of the principal well.
- Completion of a specialized subsurface sampling program to evaluate the ambient geochemical and physical properties of the unsaturated zone.
- Completion of a geotechnical investigation of the foundation soils underlying the proposed surface facilities, including selected facilities to be used for managing process solutions, sediments and water.
- Completion of an environmental site assessment of the existing facilities on the FCP site to evaluate the presence of soil contaminants.

As described in Exhibit K-2 of this Application, prior to commencement of PTF operations, aquifer tests will be conducted in order to evaluate subsurface characteristics of the Bedrock Oxide Unit, overlying basin fill units, and the confining Middle Fine Grained Unit within the PTF Area of Review.

I.4 Formation Characterization Data

I.4.1 Fluid Pressure Data

The proposed injection is to occur in the saturated oxide zone of the bedrock underlying the FCP site. This bedrock oxide zone is in the upper part of the bedrock and consists of primarily Precambrian quartz monzonite and Tertiary granodiorite porphyry. The upper portion of the bedrock oxide zone consists of a weathered, rubbly mixture of fracture-filling minerals and angular bedrock fragments. Below this weathered

zone, the oxide bedrock consists of extensively fractured quartz monzonite, granodiorite, and associated dikes. Movement of groundwater through the bedrock oxide zone is largely controlled by secondary permeability resulting from faults, fractures, and associated brecciation.

The bedrock oxide zone is in hydraulic communication with an overlying sedimentary deposit, the Lower Basin Fill Unit (LBFU). Both the bedrock oxide zone and LBFU behave as confined to semi-confined hydrostratigraphic units. Because of the confining to semi-confining conditions, fluid pressure within the bedrock oxide zone is sufficient to create a piezometric surface that was measured in 2010 at elevations between approximately 1,270 and 1,275 feet above mean sea level.

Potentiometric elevations observed in the bedrock oxide zone and other hydrostratigraphic units are summarized in Section 4.3, and are shown on Figures 4.3-9(II) through 4.3-13 (II) of Exhibit I-1.

I.4.2 Fracture Pressure Data

During 1995, BHP Copper conducted 14 hydraulic packer tests in open boreholes for the purpose of defining the fracture gradient of undisturbed bedrock within the oxide zone. The methods and results of the core hole packer testing are described in Sections 2.3.6 and 4.3.3.9, respectively, of Exhibit I-1. Fracture gradient packer testing data are included in electronic format as Exhibit I-2.

I.4.3 Physical and Chemical Characteristics of Formation Fluids

Data describing the physical and chemical characteristics of formation fluids in the region and at the FCP site are described in Sections 3.8 and 4.5 of Exhibit I-1, respectively.