



Janet Napolitano  
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# ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

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Stephen A. Owens  
Director

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July 14, 2008

Mr. Ned Hall  
Chief Environmental Engineer  
Freeport-McMoRan Sierrita Inc.  
Environment, Land & Water Department  
6200 West Duval Mine Road, PO Box 527  
Green Valley, AZ 85622-0527

RE: Voluntary Remediation Program Investigation Work Plan  
Freeport-McMoRan Sierrita Inc. Green Valley, Arizona  
VRP Site Code: 100073-03

Dear Mr. Hall:

The Arizona Department of Environmental Quality (ADEQ) Voluntary Remediation Program (VRP) has reviewed the *VRP Investigation Work Plan* (Work Plan), submitted by URS Corporation (URS) on behalf of Freeport-McMoRan Sierrita Inc (Sierrita), received by ADEQ on May 2, 2008. The VRP has issued, under separate cover, comments regarding the *Quality Assurance Project Plan* (submitted in Volume II as Appendix B of the Work Plan) and the *Sampling and Analysis Plan* (submitted in Volume I as Section 4.0 of the Work Plan). This letter pertains to all other sections of the Work Plan.

The VRP hereby approves the Work Plan as written, with the exception of proposed work at the "Old D Pond". As indicated by the VRP in a meeting held with Sierrita on May 27, 2008, the VRP cannot approve the proposed investigation of the "Old D Pond" until an amendment is filed with, and accepted by, the Aquifer Protection Permit (APP) Program to revise the nomenclature in the current APP, where the "Old E Pond" is mistakenly referenced as the "Old D Pond". Once the VRP is shown the amended APP, the Old D Pond will be accepted by the VRP as an approved area for investigation under the VRP.

The attached table lists the VRP-approved Areas of Interest and their target compounds. The table includes five main soil investigative areas (A - E) which are further broken down into subset areas. In addition, the table includes the site-wide groundwater investigation (F). Please feel free to use the alpha-numeric references from this table in future submittals to the VRP to reduce crowding of text on the figures and for ease of reference. If you have any questions regarding this letter, please do not hesitate to contact me by electronic mail at [jp8@azdeq.gov](mailto:jp8@azdeq.gov) or by telephone at (602) 771-4574.

Respectfully,

Joey Pace, Project Manager/Hydrologist  
Voluntary Remediation Program

C: Richard Mendolia, ADEQ, WQD, GWS, APP & Drywell Unit

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**Sierrita Mine Investigation Work Plan  
Approved Areas of Interest**

Freeport-McMoRan Sierrita Inc. Green Valley, Arizona  
VRP Site Code: 100073-03

ADEC Map Ref	Area of Interest	APP Regulated Facility? (Y or N)	Target Compounds	Former Use	Current Use	Goal in Work Plan	Notes
<b>A DEMETRIE WASH</b>							
A1a	Former CLEAR Plant (including A1b & A1c)	N	metals	The copper leach electrowinning and regeneration plant operated 1977 through 1983;	The CLEAR Plant building remains but the process equipment is gone.	No Further Action Determination through VRP	
A1b	Former Evaporation Pond	N	metals	This pond received spent copper solution from CLEAR Plant.	Excavated soils removed, stockpiled, and later used to grade New D Pond.	No Further Action Determination through VRP	
A1c	Former E Pond	N	metals	This pond contained overflow from CLEAR Plant.	None	No Further Action Determination through VRP	
A2	Old D Pond	see notes	metals	This pond was located 1000' south of CLEAR Plant and used in 1990s. It was constructed in 1974. Pond misidentified in APP Permit.	None	No Further Action Determination through VRP	Sierrita must amend APP prior to investigation of this location commencing under the VRP. The APP lists Old D Pond to be closed. Permit will be revised to reflect Old E Pond.
A3	Former Esperanza Mill	N	metals	Mill processed sulfide ore. Area had mill, two thickeners, raw water pond. Mill operated 1959 through 1981.	None	No Further Action Determination through VRP	
A4	Former C Pond	N	metals	Pond received runoff from Sierrita crusher dust. Duval Canal Extension put pond out of use in 1994;	None	No Further Action Determination through VRP	Investigation will include C Spills Area, the area which received sediments too thick to be piped out;
A5	Former Raffinate Pond	N	metals	Received raffinate from Former Precipitate Plant but was replaced by APP permitted ponds elsewhere. This pond appears in 1979 aerials but is gone by 1994.	None	No Further Action Determination through VRP	
<b>B AMARGOSA WASH</b>							
B1a	Headwall No. 1	Y	metals radionuclides	N/A	PLS collected at Headwall No. 1 is conveyed to SX Plant No. 2	To investigate potential historical release(s) to the environment. VRP will not issue NFA for this investigation.	
B1b	Bailey Lake	Y	metals radionuclides	N/A	Contains overflow and subsurface flow from Headwall No. 1.	To investigate potential historical release(s) to the environment. VRP will not issue NFA for this investigation.	
B2	Raffinate Pond No. 2	Y	metals radionuclides	N/A	Temporarily stores copper-depleted leachate solution from SX Plants 1 & 2; raffinate gets recycled back to leach piles; constructed in 1983; it is double lined.	To investigate potential historical release(s) to the environment. VRP will not issue NFA for this investigation.	
B3	Amargosa Pond	Y	metals radionuclides	Previously served as old raffinate pond until 1993 and was upgraded and expanded in 1994.	A single-lined pond capable of containing 100-yr/ 24 hr storm event; Also provides containment for Headwall No. 1 upset conditions	To investigate potential historical release(s) to the environment. VRP will not issue NFA for this investigation.	Amargosa Pond was unlined prior to APP regulations.
B4	Former A Pond	Y	metals radionuclides	Pond built to retain overflow from Amargosa Pond during storm events; use ceased after 1995.	Amargosa Pond improvements made in 1995 led to Former A Pond falling into disuse. Closure is regulated under APP Permit.	To investigate potential historical release(s) to the environment. VRP will not issue NFA for this investigation.	Former A Pond was closed under the APP. If impact is discovered, cleanup will be under the APP, but the investigation of potential releases will be overseen by the VRP.
B5	Former B Pond	Y	metals radionuclides	Pond constructed in 1960. Received overflow from Former A Pond.	None	To investigate potential historical release(s) to the environment. VRP will not issue NFA for this investigation.	Former B Pond has not yet closed under the APP. If impact is discovered, cleanup will be under the APP, but the investigation of potential releases will be overseen by the VRP.
B6	Launders Facility	Y	metals radionuclides	Pond constructed in 1958 and contained 22 bins filled with scrap iron. PLS was pumped into bins and copper precipitated onto iron. Use discontinued in 1987.	None	To investigate any potential releases through VRP in order to close (with APP) in advance of Final Mine Closure.	
<b>C ESPERANZA WASH</b>							
C1	Headwall No. 2	Y	metals radionuclides	None listed; This impoundment may have been unlined historically.	Lined impoundment receives PLS from leach stockpiles. PLS from here is pumped to Raffinate Pond No. 3.	To investigate potential historical release(s) to the environment. VRP will not issue NFA for this investigation.	
C2	Headwall No. 3	Y	metals radionuclides	None listed; This impoundment may have been unlined historically.	Lined impoundment collects PLS from leach stockpiles in the former channel of Esperanza Wash; built in 1993;	To investigate potential historical release(s) to the environment. VRP will not issue NFA for this investigation.	
C3	Raffinate Pond No. 3	Y	metals radionuclides	Originally designed to store raffinate; Pond constructed in 1993.	Pond receives solutions from Headwall No. 3 through concrete vault & pump system. PLS is also pumped from Headwall No. 5 to here.	To investigate potential historical release(s) to the environment. VRP will not issue NFA for this investigation.	

**Sierrita Mine Investigation Work Plan  
Approved Areas of Interest**

Freeport-McMoRan Sierrita Inc. Green Valley, Arizona  
VRP Site Code: 100073-03

ADEC Map Ref	Area of Interest	APP Regulated Facility? (Y or N)	Target Compounds	Former Use	Current Use	Goal in Work Plan	Notes
C4	Headwall No. 4 (SX-3 Stormwater Pond)	Y	metals radionuclides	Unlined pond originally used to contain potential overflows from Headwall No. 3 and Raffinate Pond No. 3.	Pond redesigned in 1994 as a single-lined stormwater reservoir. Sierrita intends to maintain this as a stormwater retention pond after APP closure.	To investigate potential historical release(s) to the environment. VRP will not issue NFA for this investigation.	
C5	SX Plant No. 3	Y	metals radionuclides	Plant constructed in 1994 to handle PLS from sulfide leach piles. The plant only operated for 30 days. The tank farm was exempt under 1999 Best Available Demonstrated Control Technology amendment to APP application.	Remaining plant equipment is used to gather PLS from leach stockpiles and transfer to SX Plant No. 2;	To investigate potential historical release(s) to the environment. VRP will not issue NFA for this investigation.	
<b>D TINAJA AND UNNAMED WASH</b>							
D1	Headwall No. 5	Y	metals radionuclides	Constructed in 1992 and originally planned to contain stormwater and redirect it for mine operations water.	Western portion of active sulfide leach pile drains into unnamed wash and then into Headwall No. 5 where the solutions are pumped into Headwall No. 3.	To investigate potential historical release(s) to the environment. VRP will not issue NFA for this investigation.	
<b>E TAILING IMPOUNDMENTS</b>							
E1	Esperanza Tailing Impoundment	Y	metals radionuclides	Impoundment in use from 1959 through 1971; December 1971 - January 1973; Intermittently operated January 1979 - December 1981. Impoundment capped after closure in 1981;	In 1991-1992, tailings from Twin Buttes Mine deposited in west half of tailings impoundment. Currently the impoundment is used for tailing deposition on a limited basis during emergency clean-outs of Sierrita tailing slurry pipeline. Sierrita has stated that the Esperanza Impoundment does not receive wet tailings anymore.	To investigate potential historical release(s) to the environment. VRP will not issue NFA for this investigation.	
E2	Rhenium Ponds	Y	metals radionuclides	Constructed in 1981 and consisted of three cells excavated into Esperanza Tailings. The ponds were used for storage and for evaporation process solutions from Rhenium Plant.	Use discontinued in 1998; soils excavated from cells and placed in leach area and the ponds were backfilled and graded.	To investigate any potential releases through VRP in order to close (with APP) in advance of Final Mine Closure.	
E3	Sierrita Tailing Impoundment	Y	metals radionuclides	In operation since 1970;		To investigate potential historical release(s) to the environment. VRP will not issue NFA for this investigation.	
<b>F GROUNDWATER INVESTIGATION</b>							
	Site-wide	N/A	Soil: Total Metals  Soil & Water: U-234, U-235, and U-238 Anions pH Radium-226 Radium-228  Water: Dissolved Metals Gross Alpha & Beta	N/A	N/A	No Further Action Determination through VRP	Three aquifer layers: Alluvial, Basin Fill, and Bedrock; Multiple lithologic formations; Multiple scenarios for uranium source to be investigated;