CRITIQUE OF RECLAMATION PLAN
JACKPILE-PAGUATE URNAIUM MINE
September, 1980

Confidential Claim Retracted
Authorized by: SC
Date: 6/12/13

EXECUTIVE SUMMARY

- Various reports and environmental studies are stated as being completed or ongoing, but were not referenced nor is any data presented.

- Specifics on the level of radiological control, hazardous waste identification and management, and ground and surface protection are not adequately presented to permit evaluation of the plan.

- The proposed monitoring program for three years following the completion of earth moving, grading, and seeding is not presented in adequate detail and is not tied to any commitment to initate corrective action if problems are identified.

- The commitment by Anaconda through their policy statement indicates this document will address all the objectives stated in the Executive Summary.

1.1 PURPOSE AND REQUIREMENTS

- Repetition of statements from the Executive Summary and Introduction throughout the document is monotonous.

- The potential impacts of open pit backfilling of hazardous wastes on the ground water and the subsequent impacts on the surface waters are not addressed.

- Statements were made that actions will be taken where a potential impact is projected to occur and as needed to meet established regulatory guidelines; however, neither the criteria that will trigger action nor the regulations are presented or referenced.

- Specifics on the reclaimed 485 acres should be presented, including range survey data, radiological attentuation, etc.

- The plan indicates Anaconda's use of experts, consultants, several years of reclamation experience and reclaiming 485 acres to compile the document, however, upon evaluation these contributions achieved no siginifcant benefits.

1.2 CONTENT OF THE RECLAMATION PLAN

- Literature reference of pre-mining land use should be listed.

- A 500 scale map with 10 feet contours should be made available to depict before and after reclamation activities.

- Reclamation studies should be documented and published.

- Plate 6.1-1 is lacking a legend.

- Plate 6.1-1 measurements of backfill and dumps do not in all cases correspond with the cross section plates.

2.0 RECLAMATION OBJECTIVES

2.3 ELIMINATE HEALTH AND SAFETY HAZARDS

- The procedures used to identify potential radiological hazards should be discussed, the criteria followed in disposing of the hazardous waste, and the potential impact on ground and surface water should be discussed.

- The depth of cover above mineralized zones on the pit walls should be specified and the adequacy of such cover with respect to radiological control should be discussed.

- The evaluation criteria used to evaluate long term stability of pit high walls should be presented.

- The fencing of portions of the pit wall crest in the vicinity of the Paguate Village is not adequate. Methods to eliminate this safety hazard, as committed to in basic reclamation objective (2), should be presented.

2.2 MITIGATE EFFECTS OF DISTURBED LAND

- No evidence is presented to substantiate the premise by Anaconda that over an unspecified time period the evaluation of revegetation efforts have shown that an older reclaimed areas plant species diversity, cover and forage production approximate that on surrounding undisturbed rangeland.

- Where will alluvial material for topdressing be borrowed from?

2.3 ELIMINATE HEALTH AND SAFETY HAZARDS

- The materials which constitute a potential radiological hazard should have been outlined and discussed in detail. Similarly, the criteria utilized to identify these potential radiological hazards should have been discussed.

- Fencing the pit wall crests in the vicinity of the Paguate Village does not necessarily constitute a viable safety precaution. Who will maintain these fences?

- The evaluation techniques for long term stability of the pit high walls were not presented. For example, will there be a monitoring program associated with verification of long-term stability? Additionally, what is the time period associated with the phrase "long-term"?

- The static and dynamic (seismic loading) criteria that will be used to assure safe, stable repose of the dump slopes was not presented.

- A discussion of the typical design, construction and use of the erosion berms proposed to control water movement was not presented.

- Identify materials that constitute a potential radiological hazard in terms of location, activity and components and their unique hazards.

- Describe, based on above, how the material will be covered, the material to be utilized as a cover and its calculated shielding.

- Describe technique to be used in covering the mineralized zone on the pit wall.

- To what levels of activity is the wall to be covered?

2.4 PROTECT THE ENVIRONMENT

- Physical land alteration and establishment of vegative cover must (not should) be designed to provide erosion control water harvest and runoff control.

- The air quality and water quality monitoring programs were not presented and discussed in sufficient detail to demonstrate the capabilities of these programs to assess the effectiveness of the proposed Reclamation Plan to protect the environment over the long term.

- The utilization of the air quality and water quality programs to establish baseline levels was not adequately addressed.

- The document does not attempt to evaluate the potential air emissions and impact on the Pueblo of the Reclamation efforts. The substantial amount of surface work and soil disturbance inherent in reclamation could potentially cause air particulate emissions. This is particularly an important issue due to the semi-arid climate on the Pueblo.

- The control of water movement by the erosion berms should be presented in greater detail. How will this water be managed; where will it go?

- The ground water protection afforded by back filled pits should be discussed.

- What will be the baseline or comparison criteria for the assessment of air and water quality data with respect to effects of reclamation? What if any action will be taken if the data indicates problems with the reclamation.

4.0 EXISTING CONDITION

4.1 GROUND DISTURBANCE

4.1.1 GENERAL

- The data stated as showing that mining has had no significant adverse effects to the environment outside the mine area should be presented along with the criteria upon which such an evaluation was made.

- The report: "Summary of Water Resources Investigation, 1973-1975" by F. P. Lyford disputes the above.

4.1.2 SURFACE DISTURBANCE

- With overall slope angles of the pit walls ranging from 45 to 53 degrees it is highly improbable that these walls will exhibit long term stability.

- The potential environmental impact due to erosion of the 27 waste dumps not structurally altered should be discussed.

- The method and adequacy of drill hole plugging should be addressed.

4.2 ENVIRONMENTAL CONDITIONS

4.1.1 SURFACE WATER

4.2.1.1 STREAM CHARACTERISTICS

- What was the period of base flow data collection and when was the data collected with respect to mining activities.

- The impact of the mine on surface water quantity and quality should be discussed.

- The water quality (analysis of the chemical constitutents) and flow rates for the Rio Paguate and Rio Moquino are presented in very general terms. More detailed data are necessary to characterize these parameters over the various seasons of the year. The monitoring program should be designed to provide this information on a continuing basis over the long term.

- What erosion control measures were instituted on re-channeled streams.

- The criteria used to determine no significant adverse effect of sedimentation due to mining should be presented and discussed.

- The radiological impact on Mesita Reservoir should be discussed or if the study is still underway a time frame for providing the information should be presented. If high radiological values on an impact to the reservoir is observed, corrective actions should also be presented.

4.2.2 GROUND WATER

- Anaconda contends that the effect of mining upon ground water extends only limited distances form the active mining areas due to the hydrologic properties of the Jackpile sandstone. These properties should be discussed in more detail to substantiate their hypothesis.

- The relationship between the disposal of hazardous waste and ground water levels and fluctuations should be discussed. Potential water related impacts in conjunction to the hazardous waste disposal should be discussed.

- The locations shown on Plate 4.1-2 indicate that the three operating underground mines underlie the North Paguate and South Paguate pits, i.e., P-10, P-7, and PW-2/3. Since the proposed plan infers that the pits will be reclaimed prior to the end of the operations, what special procedures are proposed to prevent subsidence?

- The locations of the two mined-out underground mines, H-1 and P-9-2 are not shown on any of the accompanying plates or maps.

- What are the possibilities that contaminated ground water from fractured acquifers may seep into surrounding good quality aquifers?

4.2.3 AIR QUALITY

An important aspect of any air quality impact analysis is the description of baseline conditions. For this case it would be helpful to have baseline information for the affected area before mining, during mining, and after mining for that reclamation that has taken place to date. Although the document infers that there has been an air quality monitoring program on and off the lease site, no quantitative data exists in the document to substantiate the baseline ambient air quality on meteorological conditions for the site.

The primary air pollutant of concern to the Laguna Pueblo is particulates. Both total suspended particulates (TSP) and particulate size distribution data (particularly where people reside) should be available. This data was not in

the document. However, it was implied that information on TSP has been collected historically both on and off the lease site. Data on particulate size distributions, which are essential to human health impact determinations, apparently has not been collected.

One point on particulate monitoring needs to be clarified. In the Reclamation Plan, the statement was made that air quality monitoring was performed for a 168 hour time period for a month. There exists some confusion on whether this is for a 168 continuous sampling period or for a non-continuous 6-twenty four hour period. To have been consistent with federal monitoring guidelines, a non-continuous twenty four sample taken once every six days should have been collected.

The meteorological data collected at site P-10 should be summarized and should be included in the document. Without the data on wind speed and wind direction, it is difficult to adequately evaluate the baseline air quality data. Once this information is provided, a review of the need for other meteorological sites can be made.

4.3 ONGOING RECLAMATION ACTIVITIES

- Approximately four years of experimental reclamation activities does not constitute long term verification of a reclamation plan for a disturbed area of this size (485 acres reclaimed out of a total disturbed area of 2,626 acres). The presently reclaimed areas may or may not be typical of the problems encountered during the course of the entire program.

- What are the characteristics of the backfill material already placed back into the pits and what, if any, has been the impact on water quality.

- This section is narrow and poorly written. It contains few facts, considering the magnitude and complexity of the problem. It should be expanded.

5.0 RECLAMATION AND ENVIRONMENTAL BACKGROUND

5.1 PREVIOUS RECLAMATION PLANS

- Anaconda implies that the previously resubmitted Mining and Reclamation Plan (March, 1979) is still awaiting approval rather than being rejected and also seems to ignore the intent and requirements set forth by Governor Early in his June 9 letter.

- CERT's evaluation of the above plan and the current one concludes Anaconda ignored the intent and requirements set forth by Governor Early's letter of June 9, 1980.

5.2 ENVIRONMENTAL STUDIES CONDUCTED

- A more detailed discussion of the monitoring programs should be presented and collected data summarized.

- Specific references for the studies and programs undertaken by consultants and government agencies should be provided.

- Are the four control stations previously mentioned in item (e) utilized to establish representative background levels for non-reclaimed areas?

- The measurement techniques, sampling frequencies equipment specifications and criteria for the selection of monitoring sites for the five surface water and four ground water locations shown in Plate 6.2-2 are not discussed.

- The criteria for selection of the locations of additional ground water monitoring wells being drilled was not presented.

- Why are additional wells being drilled if no problems are anticipated as previously inferred in Section 4.2.2?

- Neither the evaluation procedure nor the criteria for measurement of the success or failure of the revegetation program are discussed.

- Although a list of studies performed by various consultants and governmental agencies for Anaconda, that are germane to the development of the Reclamation Plan, is presented, none of these studies is discussed in detail and/or is attached to the subject Reclamation Plan as an appendix--which is a normally acceptable format.

General Comment - Only a very general overview of the ongoing environmental monitoring program is presented in this document. A more thorough, detailed discussion of these programs including criteria for the selection of the monitoring sites and the data and analysis results derived to date, is necessary.

- The discussion implies the equivalent of one week (168 hours) is collected per month at each of the four stations at locations shown in Plate 5.2-1. However, insufficient information is presented with respect to sampling frequencies and rates, equipment specifications, sampling techniques employed and chemical analyses methods utilized.

- The measurement techniques, frequency of measurement and equipment specifications are not described.

- The locations of the control stations for evaluation of background exhalation flux levels are not identified, nor are any background levels presented.

- The measurement techniques, equipment specifications and criteria for establishment of the four control stations shown in Plate 5.2-1 are not discussed.

- Are the control stations utilized to establish background levels in the non-reclaimed areas?

- The sampling techniques, sampling frequencies and equipment specifications are not outlined.

- Since air quality impact analysis was not adequately addressed, it follows that the proper development of measures to control or minimize air quality particulate emissions were not included in the document. A plan on how to control the emissions from traffic and surface soil activities need to be more thoroughly discussed in the document. Not only do the methods need to be identified, but also their adequacy to control emissions is needed.

- Conclusions and Recommendations

  Unfortunately, the air quality assessment and impact analysis identified in the Jackpile Reclamation Plan performed by the Anaconda Company, is lacking, making it difficult to determine the potential impact to the Laguna Pueblo. A lack of specific ambient air quality and meteorological data necessary to detemine baseline conditions has been noted. Basic air quality analysis to determine the specific impacts on and off the lease were not performed in the document. Also not included in the analysis were measures to mitigate any air pollution problems associated with mine reclamation.

  In order to correct the above mentioned major difficiencies in the document the following additional issues should be pursued by Anaconda.

  - Provide all available quantitative information on particulate sampling on and off the lease site.

  - Initiate monitoring for particulate size distribution on and off lease site using accepted techniques.

  - Clarify monitoring methods for particulates.

- Provide a summary of meteorological data available and review other sites.

- Meteorological data, model worst case air quality impacts on and off reservation for mining and after mining activities.

- Specify mitigation methods to be employed during reclamation.

- Commit to the general purpose of environmental protection on the Pueblo according to the goals of the Tribe.

6.0 RECLAMATION

6.1 SURFACE MODIFICATION

6.1.1 GENERAL

- Where will the backfill and capping material be obtained? No borrow pits are indicated on the plates or maps.

- When discussing capping material, exactly what material will be utilized for this purpose?

- Ore-associated waste is to be capped with shales and sandstones. What is the depth and compaction of the cap material in place and what levels of activity are being sought?

- Will the above material be classified or size graded prior to use? If so, the procedure should be presented.

- The basis for radioactivity levels and the specific levels that the roads and shop areas will be cleaned to is never discussed.

- Since Anaconda proposes to excavate the dumps placed along the Rio Paguate and Rio Moquino a distance of 200 feet from the stream beds, how will these mounds be stablized to prevent subsequent movement from wind and water erosion over the long term?

- The identification and management of hazardous waste should be discussed in detail and potential environmental impacts identified.

- What criteria was used to determine the "suitable distance from the stream" for dumps along the Rio Paguate and Rio Maquino.

6.1.2 PITS

- Describe the amount of backfill determination methodology. Describe the extent of radiological mineralization of the pit floor and up the pit walls and the levels factually determined to require backfill.

- What soil analysis limitations are suitable for seeding into?

- If and when vegetative cover is adequate to support grazing, will there be any monitoring program to determine whether or not any toxic elements are accumulating in the vegetation?

- Define standard revegetation procedures.

6.1.3 DUMPS

6.1.3.1 DUMPS RECLAIMED TO DATE

- The reasons why Dumps, I, Y_2, J and T require additional reclamation activity should be explained in detail.

- Have any of these dumps been extensively sampled and their representative chemical compositions determined? If so, the results of these analyses should have been presented.

- Radiological levels following a presently reclaimed waste dump should be presented and the relationship between those levels and levels anticipated for the areas to be reclaimed should be discussed.

- Describe in detail the successes of reclaimed areas and document data supporting why no further action is planned.

- What is the definition of "Standard revegetation procedures"?

- Define hazardous material to be removed and describe where this material will be placed.

- What range of chemical properties and parameters does the Tres Hermarros possess to declare it favorable for vegetation establishment?

6.1.3.2 DUMP STABILITY AND EROSION CONTROL

- A detailed description of the stability analysis performed by consulting rock mechanics specialists for the 32 waste dumps existing in the combined

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Jackpile-Paguate Mine Area should be presented in this section.

- Discuss in detail what the planned modification of terracing are for the five unstable dumps and define the term "safe" as used here.

- Again, define the terms "non-hazardous" and "hazardous" as used in this plan and discuss the criteria that was used in connection with these terms.

- The potential for erosion does not appear to be a consideration in the design of the plan. Only waste dump stability is considered and only five dumps are proposed to be changed.

- Erosion potential and environmental impacts from the unaltered waste dumps should be presented.

- What criteria is used to determine if non-hazardous cover is needed for reclamation of the waste dumps.

6.1.4 STOCKPILES

- To what radiological level will the land under the stockpiles be reduced after the piles are removed?

- How will the gamma radiation background levels be established, since it is indicated that these levels will be one of the criteria for the stockpiles, protore and ore-associated waste piles reclamation?

6.1.5 PROTORE AND ORE-ASSOCIATES WASTE PILES

- What is the uranium values contained in the protore and ore-associated piles and what will be the potential imoact of relocating these piles to the pit.

- Define background gamma radiation levels.

- Describe method to be used in revegetating area under protore and associated ore-stockpiles.

6.1.6 DRILL HOLES

- Have important aquifer systems been intercepted by the drill holes? Has aquifer interconnection occurred and if so what is the impact?

- Is surface plugging if drill holes adquate to insure no environmental impact?

- To what extent will plugging be done, total depth or just surface.

- Describe in detail how drill hole sites and the roads to drill sites will be reclaimed.

- Since over 20,000 development and exploration drill holes have been drilled on the Jackpile-Paguate mining leases, how can one be certain that all these holes will be plugged unless appropriate inventories have been recorded and maintained over the 17 year operating period? A detailed discussion of this potential problem area is needed.

6.1.7 SURFACE STRUCTURES

- Describe how portions structures that are non-salvageable will be disposed in the pit.

- To what levels will areas be cleaned of radiological contamination? What criteria or standards will be used?

- To what levels will the four major roads which cross the property be decontaminated? How will the decontamination be done? Where will the contaminated material be disposed?

- Describe as above how all other areas will be removed and cleaned of radiological contaminants.

- Define what is meant of "free of radiological hazards".

6.1.8 SURFACE WATERWAYS

- Sedimentation analysis is necessary to define that contamination attributable to Anaconda operations. It is also necessary to establish the condition of the reservoir to proposed water use. The definition of Anaconda's contribution can be identified via ratio analyses techniques. Water analysis should accompany the sedimentation analysis, especially during spring run-off season when the sediment would be disturbed.

- Concerns pertaining to sedimentation and radiological contamination of the Mesita Reservoir should be resolved by a detailed sedimentation analysis to determine the proportion of contamination that is due to the Anaconda mining activities since 1953. Complementary sedimentation and water analyses are needed to determine the probable degree of contamination.

- What criteria was used to determine the 200 foot offset for waste dump along the Rio Paguate and Rio Moquine? Does this offset maintain the runoff characteristics of the streams. A time frame for presenting findings of the study on the Mesita Reservoir should be presented?

6.1.9 GROUND WATER

- The preliminary data from ongoing ground water studies indicating that there may be very limited recovery of ground water into the backfilled pits should be presented and the above premise substantiated by a more detailed discussions.

6.1.10 REVEGETATION METHODS

- Define successful results.
- What is the rationale behind thickners of topdress required?
- If cover material is taken from areas indicated to be poorly vegetated, can these areas be successfully reclaimed and revegetated? Will use of the borrow areas impact surface waters?
- Have contanerized seedlings been considered.
- Table 6.1-4 shows some mistakes on characterization. Source of information should be listed.
- How are nutrient requirement levels determined.
- Are seeding rates figured on bulk or pure live seed basis?
- Which slope angles will accommodate seeding equipment?
- Three year wait period prior to grazing should be justified.
- Are all plant species in the seed mixtures indicative of the area?
- Is irrigation being considered?
- Fencing revegetated will control livestock invasion.

6.2 UNDERGROUND MODIFICATIONS

- It is mentioned that consultants are conducting a stability analysis of the material supporting the underground workings and thay any proposed mitigation methods for preventing possible subsidence from underground observations must await the results of

these analyses. However, there is not indication as to when and how this issue will be resolve prior to the cessation of existing underground operations. Anaconda should agree to resolve this matter satisfactorily prior to being relieved of its obligations with respect to the reclamation program.

- A time frame for completing the underground workings stability analysis and how the findings will be incorporated into the reclamation plan should be presented.

6.3 POST-RECLAMATION

- Based upon the nomadic nature of livestock on the reservation, it is hoped that some latitude will be allowed for inadvertent grazing within three years after seeding has taken place. Otherwise, fencing seems to be the only other alternative to this dilemma.

- What provisions are provided for on follow-up.

- The three year period should be only adhered to with consent of the Laguna Tribe.