SEP 10 1985

Docket No. 40-8714

Cleveland-Cliffs
818 Taughenbaugh Boulevard
P.O. Box 1211
Rifle, CO 81650

Gentlemen:

This refers to your letter dated July 24, 1985, concerning contamination in the existing well fields and your proposed programs.

An application fee of $150 is required as specified in fee Category 2E of §170.31 of Part 170. Payment should be made to the U.S. Nuclear Regulatory Commission and mailed to my attention.

Sincerely,

Original signed by
J. D. Weiss

Douglas Weiss
License Fee Management Branch
Office of Administration

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Docket File
DWeiss
LFMB R/F

no response
as 10/23/85
memorandum

OFFICE	LFMB:ADM						
SURNAME	DWeiss:jp						
DATE	9/10/85						

9/5/85

Docket No. 40-8714

TO: William O. Miller, License Fee Management Branch

SUBJECT: MATERIALS LICENSE AMENDMENT CLASSIFICATION

APPLICANT: Cleveland Cliffs Iron Co

License No: SUA-[illegible] Fee Category: F

Application Dated: 85-07-24 Received: 85-07-26

1. The above application for amendment has been reviewed by NMSS/REGIONAL OFFICE in accordance with §170.31 of Part 170, and will require an amendment to the license. ✓

2. The application is not subject to fees because it was filed (a) _____ pursuant to written NRC request and the amendment is being issued for the convenience of the Commission, or (b) _____ Other (State reason) ____

Signature Edward L. Hawkins

Date 9/3/85

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40-8714

Cleveland-Cliffs

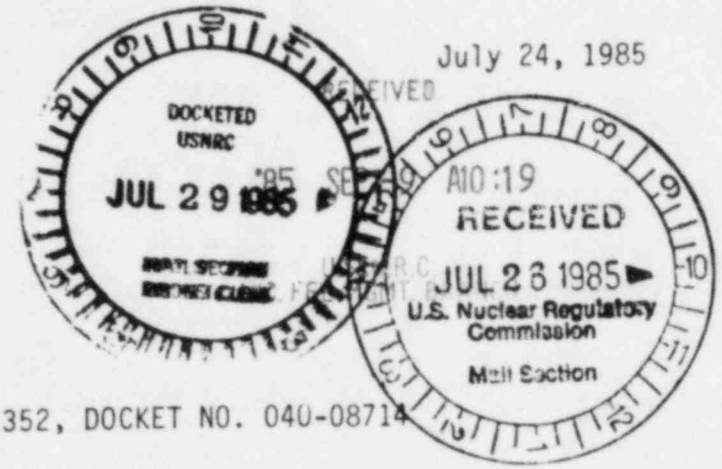
Helping develop earth's resources to meet the world's needs.

Western Division

RETURN ORIGINAL TO PDR, HQ.

818 Taughenbaugh Boulevard
P.O. Box 1211, Rifle, CO 81650
Phone: 303-625-2445

July 24, 1985



Mr. R. Dale Smith, Director
Uranium Recovery Field Office
Region IV
U.S. NUCLEAR REGULATORY COMMISSION
P.O. Box 25325
Denver, Colorado 80225

RE: SOURCE MATERIAL LICENSE NO. SUA 1352, DOCKET NO. 040-08714

Dear Mr. Smith:

As discussed during the meeting among NRC, Cleveland-Cliffs, and Thunderbird Joint Venture representatives on May 22, 1985, and as documented in your letter to Cleveland-Cliffs dated June 3, 1985, the NRC is concerned over the possible existence of a "halo" of lixiviant surrounding the well fields at the Collins Draw Project site. It was explained during the meeting that in order for the NRC to adequately complete its environmental assessment of groundwater restoration prior to license termination, it is necessary to confirm the existence or nonexistence of the "halo" and to determine the level of groundwater contamination.

Your letter states: "The basis for the NRC concerns are detailed in the attached report." There was no report attached to your letter. It is assumed that you were referring to the Williams report (Evaluation of the Restoration of Cleveland-Cliffs Iron Company In Situ Uranium Mine, Collins Draw, Wyoming by Williams and Associates, Inc., March 1985). The Williams report contains computer generated graphic displays that predict the disbursement of contaminants during restoration of the A-1 Well Field. The report contains no graphic displays of contaminant disbursement during restoration of the B Well Field.

The Williams report appears to contain much erroneous information and is being misinterpreted and misused by the NRC. As stated, "The purpose of modelling the mining and restoration activities was to evaluate whether all lixiviant and dissolved ions introduced into the 1-Sand aquifer during mining could have been removed during restoration operations" (page 34). Cleveland-Cliffs has documented to the NRC that all of the lixiviant and dissolved ions were not removed during restoration; therefore, the purpose of the modelling was to prove something that was already known. The modelling could not evaluate whether all lixiviant and dissolved ions introduced into the aquifer could have been removed, because the quantity and concentration of lixiviant injected into the aquifer and removed from the aquifer were not incorporated into the modelling data.

Fee Exempt - info

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The report states the following: "Adsorption of particles onto aquifer matrix materials has not been accounted for in this model" (pages 31 and 35). "The number of particles injected into the aquifer or remaining in the aquifer after restoration should not be construed to represent a specific concentration of total dissolved solids. Particles were used to simulate the migration characteristics of lixiviant during production and restoration. The presence of a specific particle represents the existence of lixiviant at that point in space only. Although particle density represents a relative concentration, no specific concentrations are implied by the presence of the particles" (page 36). "The number of particles injected in any given well per day was approximately equal to 0.00125 multiplied by the well strength. At least one particle was injected for each time step" (page 37). "The particle maps and graphic displays show clearly that a plume of particles (lixiviant) expanded continuously as time increased during the production period (lixiviant injection) from April 2, 1980 to November 3, 1980" (pages 37 and 38).

The above statements demonstrate many significant problems in the modelling and the report. Particles cannot represent lixiviant injected and removed, because the quantity and concentration of lixiviant injected and removed was not used in the model. One to eight particles were injected continuously during modelling of the production phase at each production well (Refer to Tables B-1.1 through B-1.9). Particle injection rate has absolutely no correlation to the actual lixiviant injection rate and lixiviant concentration. During the majority of the operating period, pregnant lixiviant was pumped from the well field, uranium was stripped from the lixiviant, and the barren lixiviant was recycled to the well field. There was not a continuous addition of fresh lixiviant to the well field. Therefore, particles cannot simulate the migration characteristics of lixiviant during production and restoration. The presence of a specific particle has no relationship to and cannot represent the existence of lixiviant at that point in space. Particle density does not represent a relative lixiviant concentration. The particle maps and graphic displays absolutely do not show that a plume of lixiviant expanded continuously as time increased during the production period. The model did not account for adsorption, etc., of particles or lixiviant and therefore, even if actual lixiviant concentrations had been used with the injection rates, the expansion of a lixiviant plume could not be accurately modeled because of adsorption, etc.

Based on the information contained in Williams' report, the concentration and distribution of the particles modeled has no real correlation to the concentration of contaminants or the distribution of contaminants during the in situ mining, groundwater restoration, and the post restoration-periods at the Collins Draw Project site.

As stated in your letter, Cleveland-Cliffs is requested to determine the extent and level of contaminants that may be outside of the existing well fields. The current well field concentrations, (assuming stability) will be used as a basis for comparing the "halo" concentrations. If the levels of

contaminants outside of the well fields are equal to or less than those in the well fields, no further groundwater restoration action would be required.

Based on the in situ mining and groundwater restoration operating data, and on the excursion and post restoration stability groundwater quality monitoring data, Cleveland-Cliffs most definitely believes that the concentration of lixiviant and groundwater contaminants outside of the well fields is equal to or less than the concentration inside of the well fields. The in situ mining and groundwater restoration methods used at the Collins Draw Project site have virtually limited lixiviant to the well field areas. Minor excursion and disbursement of diluted lixiviant may have occurred outside of the well field areas; however, contaminants migrating outside of the well field areas would be further attenuated by dilution, precipitation, adsorption, etc., as discussed in the Williams report. Excursion monitoring has given no evidence of the presence of a concentrated "halo" of lixiviant contaminants. It is very difficult to believe that a "halo" of contaminants more concentrated than in the well fields could exist outside of the well fields and not be detected at one of the four excursion monitor wells. The Williams report does not contain adequate evidence to justify your concerns. Cleveland-Cliffs has considered your request; however, attempting to demonstrate that a halo does not exist becomes an onerous task.

As discussed by NRC staff during the meeting on May 22, the alleged "halo" is thought to be located outside of the existing well fields, but inside of the excursion monitor wells (Wells 238, 239, 240, and 241). Also as discussed during the meeting and in Williams' report, there were preliminary indications of lixiviant excursion at Monitor Well 238 during in situ mining. Therefore, the primary zone of contamination in the "halo" is thought to be located in an area south and east of the B Well Field.

Certain assumptions have been made in order to estimate the location of the alleged "halo." Figures C-1.36 B and C-1.37B of the Williams report are graphic displays that estimate disbursement of particles in the A-1 Well Field for the post-restoration period. Well locations as shown on Figure C-1a of the Williams report were overlayed on figures C-1.36B and C-1.37B, and the distances from the wells to the particle "halo" were determined. This information was then plotted on Figure 1 to establish the "halo" outline around the A-1 Well Field. Particle disbursement in the B Well Field was not modeled. Therefore, to complete the outline of the "halo" one point approximately half the distance between Monitor Well 239 and B Well Field Wells 234 and 282 was plotted. A second point was plotted approximately 75 percent of the distance from B Well Field, Well 291, to Monitor Well 238. This point was selected closer to the monitor well because a limited excursion had been detected at Monitor Well 238 during the in situ mining phase. The outline of the "halo" was completed as shown on Figure 1.

Cleveland-Cliffs has investigated the feasibility of two optional programs to demonstrate that the concentration of contaminants outside of the well fields in the "halo" are equal to or less than the contaminants inside of the well fields. Both of these optional programs were discussed with you during our meeting on May 22, 1985.

The first optional program investigated involves a groundwater sweep by pumping at least two pore volumes of water from the well fields and discharge of the water on the surface. This optional program was determined not to be feasible for the following reasons:

(1) The pumping of water would not confirm the existence or the concentration of the alleged "halo."

(2) The natural groundwater recharge rate of the 1-Sand (mine zone) aquifer within the well fields is very slow. Therefore, the time required to pump two or more "halo" pore volumes of water from the well fields would be very lengthy (24 hours per day for at least 14 months) and unreasonable.

(3) Costs for labor, supplies, etc., to operate the pumps and the process plant to treat the water prior to discharge would be exorbitant.

(4) The pumped water to be discharged would have to meet NPDES discharge permit limitations. Due to the uranium and radium concentrations in the well field groundwater, it would be difficult to comply with the discharge limits.

The second optional program investigated involves the drilling and completion of wells into the "halo" and the sampling of the groundwater to determine the concentration of the contaminants. This optional program is considered to be superior because the alleged "halo" could be sampled and the level of contamination could be directly determined, and thus would provide the necessary data for the NRC to complete its environmental assessment.

Therefore, in response to your request to determine the extent and level of contaminants that may be outside of the existing well fields, Cleveland-Cliffs proposes to drill and complete three wells into the 1-Sand aquifer within the area of the "halo" as shown in Figure 1. Relatively flat areas would be required for drill rig placement for drilling and completing the wells. Therefore, the wells would not be drilled on the cut and fill banks. The primary zones of groundwater contamination are thought to be located south and east of the B Well Field. Two of the proposed wells would sample these areas. The first well is proposed to be located approximately midway between Monitor Well 238 and Monitor Well 239 and 30 feet north of the midpoint between Monitor Well 238 and Monitor Well 239. The second well would be located midway between Monitor Well 238 and Monitor Well 240 and 20 feet west of the midpoint between Monitor Well 238 and Monitor Well 240. A third well would be

drilled southwest of the A-1 Well Field and northwest of the B Well Field. It would be located on the line between Monitor Well 238 and Monitor Well 241, and approximately 115 feet southeast of Monitor Well 241 as shown in Figure 1. These wells have been located to obtain an adequate number of samples that represent the groundwater quality in the "halo."

Each of the three wells would be drilled to the top of the 1-Sand aquifer (mine zone aquifer, approximately 435 feet deep). The well would be cased with Centron fiberglass well casing from the bottom of the hole to the surface. The annulus between the casing and the hole wall would be cemented to prevent interaquifer communication. After the cement has cured, the 1-Sand aquifer would be drilled out and the hole would be deepened until the underlying shale or siltstone is encountered (approximately 487 feet deep). The 1-Sand aquifer portion of the well would then be screened and a pump would be installed.

After well drilling and completion, at least one casing volume of water would be pumped from each well prior to sampling. Groundwater samples would be collected one or more times from each of the wells and analyzed for the same parameters that the June 5, 1985 samples were analyzed for. Sampling and analysis of the groundwater from the three wells should adequately confirm contaminant concentration and the existence or nonexistence of the "halo."

As per your letter dated June 3, 1985, the current well field concentrations (assuming stability) will be used as the basis for comparing the "halo" concentrations. If the concentrations of contaminants in the samples from the three wells accessing the "halo" are less than the range of contamination in the June 5 samples from the well fields, then the NRC would document that groundwater restoration requirements have been fulfilled and no further groundwater restoration action would be required. If the concentration of contaminants in the samples from the "halo" are more than the range of contaminants in the June 5 samples from the well fields, then Cleveland-Cliffs will consult with the NRC to define the remedial action, if any is required.

A copy of this letter is also being submitted to the Land Quality Division, Wyoming Department of Environmental Quality, along with a request for that agency to adopt the program proposed herein as the final step to complete groundwater restoration.

If you should have any questions or desire to discuss the program proposed herein, please contact me personally at your earliest convenience.

Sincerely,

Truman E Louderback

Truman E. Louderback
Director of Environmental Affairs

TEL:ms
Attachment
cc: LQD, Wyoming DEQ

MS5

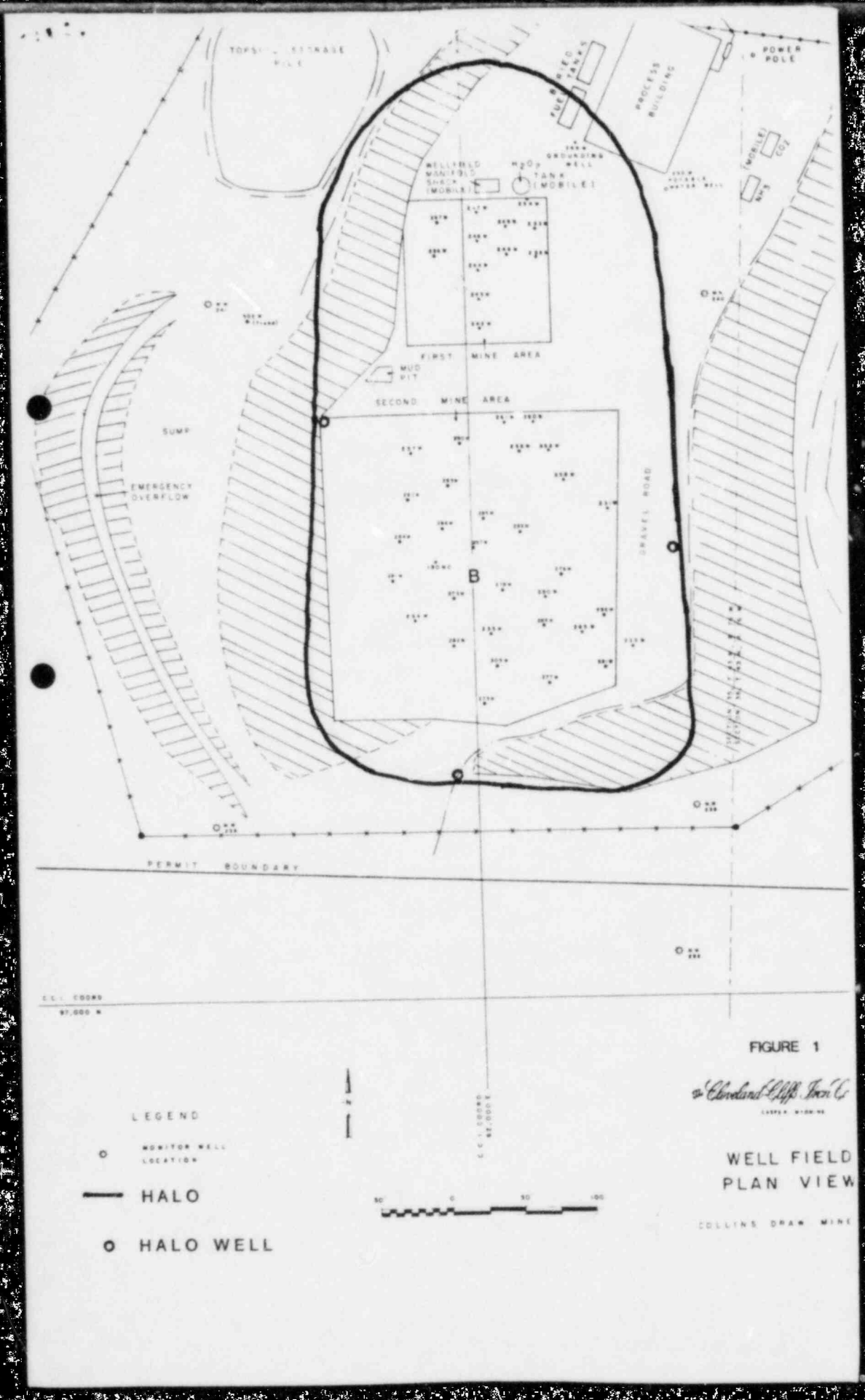

FIGURE 1

Cleveland Cliffs Iron Co.

WELL FIELD
PLAN VIEW

COLLINS DRAW MINE