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MEMORANDUM TO: Kenneth C. Jackson, Section Leader
Geochemistry Section, WMGT

Philip Justus, Section Leader
Geology-Geophysics Section, WMGT

FROM: Walton R. Kelly, WMGT
Geochemistry Section

Richard Lee, WMGT
Geology-Geophysics Section

SUBJECT: TRIP REPORTS FOR VISIT BY WMGT STAFF TO BEATTY, NEVADA, LLW DISPOSAL SITE, JUNE 19-21, 1985.

At the invitation of WMLU, Walt Kelly and Richard Lee of WMGT visted the LLW disposal site in Beatty, NV. Attached please find individual trip reports (attachments 1 and 2).

Walton Kelly
Geochemistry Section, WMGT

Richard Lee
Geology-Geophysics Section, WMGT

Enclosures:
As Stated

WM Record File
WM Project 8
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TRIP REPORT FOR MEETING AT LLW DISPOSAL SITE AT BEATTY, NV, JUNE 19-22, 1985, BY WALTON R. KELLY, WMGT, GEOCHEMISTRY SECTION.

The purpose of the trip was to discuss with State of Nevada officials the NRC's comments on the closure plan developed for the Beatty LLW disposal site and to tour the facility. On June 20, 1985, NRC staff members (Jim Shaffner, John Starmer (WMLU), John Surmeier (WMPC), Jack Hornor (Region V), Richard Lee, and myself (WMGT)) met in the town of Beatty, NV, with members of the State of Nevada Bureau of Regulatory Health Services (John Vadon, Stan Marshall, Burt Grey). Discussion of the NRC's comments on the closure plan centered on two major concerns: (1) that there was a need for site characterization and how it relates to site performance; and (2) that the monitoring plan, system, and history were inadequate.

The state officials were very receptive to our comments. Most of the discussion concerned clarifications and examples. One thing that was apparent from the meeting is that the more detailed our comments (e.g., examples that we think are appropriate), the more pertinent and helpful our comments.

Another shortcoming of the NRC's methods became apparent the following day, June 21, when we toured the site. Had members of the NRC been familiar with the site beforehand, our comments would have been more detailed and some concerns would probably have been diminished. For example, a major comment we made concerned inadequate assessment of flood and erosion potential. However, the site sits up on a knoll, perhaps 20 to 30 feet above the floodplain. The fact that the site is elevated was not discussed in the closure plan and is not readily apparent on topographic maps; our visit to the site, however, made this fact obvious. Another comment on the closure plan we made was that there was no demonstration of minimization of infiltration into the trenches. The visit to the site showed that the compacted site soil was very hard, and presumably relatively impermeable, when left undisturbed and precipitated upon. John Starmer commented that tuffaceous material (such as is present at the site) is mined in Italy and used in a siliceous cement. The point is not that our comments should not have been made, but that they would have been more thorough and helpful if we had had first-hand knowledge of the site prior to commenting.

The site itself is very impressive and seems ideally suited for LLW disposal. The trench presently operational, trench 22, is approximately 800 feet by 250 feet by 50 feet deep. Only a small fraction of trench 22 has been used to date, with mainly class A waste and some class B waste. We were able to observe waste that had been delivered on June 20 covered. The sediments exposed by the trench were very stable; the vertical walls showed little sign

of instability and erosion, especially in the lower 35 feet of the trench. The sediments were fairly coarse-grained alluvial sediments with a thick (12 feet), cobbly channel fill deposit in the lower half. The cementing material in the sediments was deduced to be siliceous. John Vadon stated that the precipitation rate is low enough and the evaporation rate high enough that there should be no local recharge to the aquifer (250 to 300 feet below the surface). The well in which levels of tritium above background has been found (well 302) is located at the southern edge of the site. The source of the elevated concentrations of tritium is still unknown. The two most convincing explanations I heard were that there were poor monitoring practices leading to well contamination or that there was leaching from older trenches where bulk material was disposed of, presumably below the zone of evaporation. The USGS is performing a study of migration in the vadose zone adjacent to the site.

We also were given a tour of the toxic waste site by the US Ecology site operator. The toxic waste site receives significantly more waste than the LLW site (at least ten times the volume).

I believe that the trip was very worthwhile for the technical staff, and that those involved in LLW should be able to visit all the sites, operating and closed, as the opportunity arises. Being able to see the site and directly ask questions based on observations is very valuable to our understanding site performance and problems.

Walton R. Kelly
Geochemistry Section, WMGT

TRIP REPORT
BEATTY, NV LOW-LEVEL WASTE FACILITY
JUNE 19 to 22, 1985

Richard Lee
Geology-Geophysics Section, WMGT

On June 20, 1985 representatives of NRC and the state of Nevada met in the Beatty, Nevada Community Center to discuss and clarify NRC comments on the U.S. Ecology Draft Closure Plan submitted to the state of Nevada on April 29, 1985. The meeting was chaired by John Vaden of the state of Nevada, and Jim Shaffner of WMLU was the NRC trip coordinator. The list of attendees is included in Enclosure #1.

While nearly all of NRC's detailed comments were discussed at the meeting, the following recurring comment from NRC appeared to apply to nearly all detailed comments. That is, to resolve NRC's comments the operator (U.S. Ecology) should: 1) provide data to more fully characterize the natural site characteristics that contribute to waste isolation, 2) demonstrate how those site characteristics contribute to site performance and potential release pathways, and 3) provide a plan that will monitor site performance. NRC made it clear that while these activities were desirable to demonstrate reasonable assurance that the site will perform as expected, it is the responsibility of the state of Nevada to request such action.

After the meeting, NRC made a vehicle tour of the site area including the Amargosa River north of the site and the hills to the east of the site. It was observed that the river appears to be more of an arroyo than a river. It was also observed that the site is located on a topographic high with as much as 10 to 15 feet of relief above the surrounding area. Because of the vast expanse of the Amargosa Desert and the subtle nature of the topographic high, it is difficult at first to recognize or photographically document the high. The high does not appear to be structurally related, and thus it is concluded to be an erosional/depositional high.

On June 21, 1985 NRC was taken on a tour of the site which included a walk into open trench #22. That trench has been open for about 3 years, and surprisingly, there was no evidence of sidewall material collapse. The material is gravelly and is interpreted to be of alluvial origin. The 50-feet deep sidewall contains 5 alternating layers, each roughly 10-feet thick, of flat-laminated fine gravel separated by coarse, cross-bedded gravel. The fine units have an average pebble size of approximately 1" but is dominated by sand-sized grains. The coarse gravel contains cobbles up to 6"-8" in diameter, a larger percentage of pebbles than the finer units, and one coarse unit near the trench bottom has a marked erosional lower contact with roughly 6' of scour in isolated areas.

Other site observations were made of the nature of the desert soil. A fine powdery matrix of the material is evident at the surface where vehicular and foot traffic are common. The matrix is soft and difficult to walk on uphill, similar to walking up a sand dune. Where the soil is undisturbed, the surface is hard and consists of a layer of roughly 1" diameter pebbles. It is presumed that fine material is eroded by wind and water leaving the pebbles at the surface in undisturbed areas. With vigorous digging by hand, I could only penetrate this hard surface to about 1" depth. It is interpreted that the fine powdery material found on the surface of disturbed areas acts as a "cement", possibly a silica cement, to bind material in undisturbed areas. This interpretation is used to explain both the hard crusty surface of undisturbed areas and the high integrity and lack of erosive collapse of the trench sidewalls.

In terms of the bearing of these observations on site performance, it is tentatively concluded that the undetermined "cement" is a key element in limiting water infiltration, surface water erosion, and trench subsidence. It should be noted, however, that these conclusions are based only on cursory site and material examination, and part of NRC's unofficial recommendations to the state of Nevada is to request an analysis of the "cement" and its contribution to site stability.

Following our tour of the LLW facility, the U.S. Ecology site manager took us on a brief walking tour of the adjacent hazardous waste facility.

My general perception is that the entire facility is effectively operated and managed. Officials from both U.S. Ecology and the state of Nevada were gracious hosts and provided us with frank responses to our questions.

From the perspective of the LLW program, I think the trip was extremely successful. The observations I made at the site, as well as the approach of the state of Nevada staff to site operations, were very useful in terms of making further technical recommendations. Had I taken this trip prior to commenting on the Site Closure Plan, my comments would have more effectively addressed the types of specific observations I made at the site. Therefore, I return with the conviction that for the staff to make effective technical comments that provide realistic assistance to states or compacts, site visits are an absolute necessity. This means that geologic site characteristics should be seen by a geologist, hydrogeologic by a hydrogeologist, and so on. The observations I made, which are important to site stability, would simply not be made by a hydrogeologist because one makes observations commensurate with one's technical background and trip objectives.

ENCLOSURE #1
MEETING ATTENDEES

State of Nevada Participants:

John Vaden
Stan Marshall
Larry (?)
Burt Grey

NRC Participants:

Jim Shaffner
John Starmer
John Surmeier
Richard Lee
Walt Kelly
Jack Horner