

40-8786/SLW/85/06/07/0

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JUN 17 1985

URFO:SLW  
Docket No. 40-8786  
04008786370E

MEMORANDUM FOR: Docket File No. 40-8786

FROM: Sandra L. Wastler, Project Manager  
Licensing Branch 1  
Uranium Recovery Field Office, Region IV

SUBJECT: URANIUM RESOURCES INC. (URI) GROUND-WATER  
SWEEP PLAN

Background

During a 1984 meeting between NRC, WDEQ and URI, the NRC expressed the concern that while restoration had been achieved at URI's North Platte site, stability of the wellfield had not been achieved. The NRC expressed the opinion that URI's injection of R.O. water at the end of restoration created a "halo" of contaminated water between the wellfield and the ring of monitor wells. Therefore, the low concentrations of ground-water parameters achieved at the end of restoration were now rising to unknown concentrations levels, as shown by the stability data. In order to retrieve the contaminated water and to stabilize ground-water parameters, the NRC requested that URI conduct further restoration at the site. By letter dated October 24, 1984, URI committed to conduct a ground-water sweep program. Source Material License SUA-1401 was modified by the addition of License Condition No. 31 to reflect URI's commitment to ground-water sweep and to require NRC's review and approval of the ground-water sweep plan prior to implementation. In accordance with License Condition No. 31, URI submitted the ground-water sweep plan by letter dated May 14, 1985 (Enclosure 1) and made a clarification to the plan by letter dated May 17, 1985 (Enclosure 2).

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## Ground-Water Sweep Plan:

As stated previously, the details of URI's proposed ground-water sweep activities are described in Enclosure 1. The following comments resulted from NRC's review of the proposed plan.

1. URI's proposal to remove 4 pore volumes of water from the wellfield may be inadequate. Since we have no idea how much contaminated water or the level of contaminants in the water that exists in the "halo," the NRC would recommend that the ground-water sweep be conducted until water quality parameter concentrations have leveled off and stabilized. The NRC expects to see contaminant concentrations increase as the "halo" is pulled back, then decrease, level off and stabilize.
2. Since the quality of water between the inspection wells and the production well (P-1) is known from the stability data, the NRC's concern is to remove the "halo" located outside the wellfield but inside the monitor wells. URI's proposal to pump only Well P-1 for the ground-water sweep will extend the time necessary to complete the sweep. Therefore, the NRC recommends that injection Wells I-1 through I-4 be used for pumping and monitoring during sweep in lieu of Well P-1, which would not need to be pumped or monitored.
3. Based on the comment above, the NRC considers the most effective means of recovering the "halo" is to pump Wells I-1 through I-4 simultaneously. If URI is unable to pump all four wells simultaneously, two wells pumped on opposite sides of the wellfield would be acceptable.

Pumping each well separately increases the probability that portions of the "halo" will remain within the wellfield as well as increasing the length of time to complete the sweep. The NRC staff therefore considers pumping individual wells to be inadequate.

4. Initial samples should not be taken from Wells I-1 through I-4 until pH and conductivity have stabilized, which indicates that aquifer water, not casing water, is being sampled.
5. Chloride, carbonate, mercury, nitrate, potassium and selenium should be added to the baseline suite of parameters. Chloride and carbonate are lixiviant parameters and therefore, can provide indications of when the "halo" is being retrieved. Mercury,

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nitrate, potassium and selenium had been elevated in specific wells during operation and could also be indicative of the "halo."

6. The NRC considers URI's proposal to solely monitor conductivity and uranium on a daily basis during sweep to be insufficient with regard to parameters measured and frequency. Alkalinity and pH should also be measured because of the distinct difference in pH between the R.O. water injected and the lixiviant. A break in pH will therefore be indicative of the "halo" being pulled in by the sweep. Since these parameters can be measured in the field and because the time it will take to begin seeing the "halo" being retrieved is unknown, daily measurements should be increased to a minimum of twice daily. The NRC would recommend measurements every 6 hours during the first few days of sweep.
7. A full baseline suite should be sampled weekly. This will allow for better control of the sweep and provide assurance that the "halo" has been retrieved and eventually, that parameters have stabilized.
8. Monitoring of MW-4 for radon monthly is inadequate. Considering the maximum length of the sweep, only one or two samples would result. This may be insufficient to show Ra-226 problem has been corrected. Therefore, MW-4 should be sampled weekly. The WDEQ has requested that Cl, sulfate,  $\text{CO}_3$  and  $\text{HCO}_3$  be monitored as well.
9. Monitor Well MW-4 should be cleaned prior to ground-water sweep. Since the elevated Ra-226 concentrations in the well may be due to plating out with calcium in the well screen and well bore, cleaning prior to sweep may allow enough samples to be collected during sweep to alleviate the problem.
10. Since the NRC and WDEQ plan to split-sample during ground-water sweep, start up should not take place until both parties are on site.

#### Recommendations and Conclusions

Based on the above review of URI's ground-water sweep plan, the NRC would recommend amending Source Material License SUA-1401 to modify License Conditions No. 31 and 33 as follows:

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31. The licensee shall conduct ground-water sweep in accordance with their May 14, 1985 submittal with the following modifications:
- Ground-water sweep will not be discontinued until the water quality parameters have leveled off and stabilized and/or the NRC has approved discontinuation of pumping.
  - The injection wells, I-1 through I-4, will be pumped, rather than P-1, during ground-water sweep. Well P-1 will not be pumped or monitored during ground-water sweep.
  - If at all possible, the four injection wells shall be pumped at one time during ground-water sweep, but no less than two on opposite sides of the wellfield shall be pumped.
  - Prior to taking initial samples from I-1 through I-4, these wells will be pumped until pH and conductivity have stabilized. Initial samples will then be taken and analyzed for the list of parameters in the May 14, 1985 letter, modified to include chloride, carbonate, mercury, nitrate, potassium and selenium.
  - After initial sampling, wells I-1 through I-4 should be sampled at a minimum of twice daily for conductivity, pH, alkalinity and  $U_3O_8$ .
  - Wells I-1 through I-4 should be sampled weekly and analyzed for the full suite of parameters as described in d. above.
  - Initial water level measurements should be taken on all injection and monitoring wells and taken daily in the monitoring wells thereafter.
  - Monitor well MW-4 should be sampled and analyzed for Ra-226, Cl, Sulfate,  $CO_3$  and  $HCO_3$  weekly during ground-water sweep.
  - The ground-water sweep program shall not be implemented until the NRC is on site.

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33. The licensee shall complete the cleaning of MW-4 in an attempt to reduce the Ra-226 values prior to implementing the ground-water sweep plan described in License Condition 31.

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Sandra L. Wastler, Project Manager  
Licensing Branch 1  
Uranium Recovery Field Office  
Region IV

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Approved by:

Edward F. Hawkins, Chief  
Licensing Branch 1  
Uranium Recovery Field Office, Region IV

Enclosures: As stated

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