

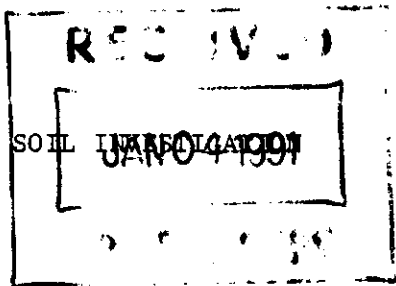
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ICPP TANK FARM CONTAMINATED SOIL

I. INTRODUCTION

A. SUMMARY

On October 1, 1974, during the course of drilling operations in connection with an upgrade construction project for the ICPP cathodic protection system, contaminated soil reading up to 40 R/hr (primarily Cs-137, Ru-106, Ce-144, and Sr-90) was encountered at a location point identified as anode I-42, approximately 10 ft south of the concrete vault which houses liquid waste storage tank WM-181 (Figure 1) and at an elevation of 6 ft 5 inches below grade level. Subsequent tests proved the source of contamination to be from an encased underground pipeline located 5 ft 5 inches south of anode I-42 (Figure 2) and at an elevation approximately 7 ft below grade level. This line was used for transfer of high-level-radioactive, liquid-waste solutions from the recovery process to the underground liquid waste storage tanks in the Tank Farm area.

A section of the pipeline and encasement was removed for inspection, and it was found that during the original construction in 1955, a 1/8-inch diameter hole had been inadvertently drilled through one side of the 3-inch stainless steel pipe at approximately the horizontal center line. It is apparent that the hole had been drilled after the pipeline had been pressure-tested and during installation of the upper section of the split-steel pipe encasement. Further metallurgical inspection of pipe and weld sections indicated no significant corrosion damage in the pipe.

Location of the hole in the pipe was such that leakage did not occur until the pipe reached a 50%-full level, a condition achieved only when it was neglected to open pertinent block valves downstream from the hole at the time a liquid waste transfer was initiated through this pipeline. Normally, leakage through the 1/8-inch hole would have been contained within the pipe encasement and conducted into downstream collection sumps. However, inspection indicated the encasement to be in a state of deterioration and partially filled with soil. The damming effect of the soil in the encasement caused sufficient liquid backup for the flow outward through the joints of the encasement and into the surrounding soil.

During excavation for encasement and pipe inspection, approximately 56 cu yd of contaminated soil containing approximately 3000 curies of radionuclides were segregated from noncontaminated soil, packaged, and hauled to the INEL Central Radioactive Waste Disposal and Storage Area (RWDSA). *The LWR C*

Eleven test pipes were driven into the area of soil contamination to depths up to 20 ft and a radiation-detection probe inserted in these pipes at various depths to log and define the zone of contamination below the pipe encasement. It was found that the area of remaining

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contamination is approximately 9 ft in diameter by 2 ft deep, equivalent to approximately 5 cu yd. It is calculated that approximately 3000 curies of radionuclides remain in the soil that has not yet been removed.

On the basis of radiochemical analysis of typical waste solutions routinely transferred through the pipeline and the moisture retention characteristics of the soil, it is calculated that the total volume of liquid waste that leaked into the soil was approximately 120 gal, containing a total of 6000 curies of radionuclides.

The failed line has been removed from service, and an existing alternate pipeline for transferring these waste solutions was tested and placed in service. At the time of this writing, removal of the remaining contaminated soil and replacement of pipe and encasement have been deferred pending replacement design changes. Costs associated with excavation, driving test pipes, and removal and packaging of contaminated soil total approximately \$22,000.

B. SCOPE

On October 17, a Review Team was appointed by ICP Management (Appendix A) "to evaluate the consequence, determine the causative mechanism(s), and define the extent of the contaminated soil body discovered in the ICPP Tank Farm during construction work for the cathodic protection program." Specifically, the team was requested to:

- (1) Determine the mechanism(s) which led to the leak of contamination into the soil.
- (2) Develop specific test procedures to confirm, if possible, how the leak occurred.
- (3) Review the past records for the tank farm to catalog known areas of soil contamination.

Additionally;

- (4) Determine if the known leaks from the WCF 10-inch off-gas and 24-inch building exhaust duct led to the soil contamination adjacent to these lines southeast of the ICPP stack. Determine whether changes now in progress (by construction) will eliminate further leakage when the WCF is restarted.
- (5) Define an experimental drilling program to determine, as practical, the extent (horizontal and vertical) of both contaminated soil bodies.

Items 1, 2, and 5 relate to the primary occurrence under investigation and have been dealt with in considerable detail. Items 3 and 4 relate to other contamination occurrences which have taken place previously and are discussed in lesser detail herein.