

License No. 04-09951-04

Department of the Air Force
1155th Technical Operations Squadron
McClellan Central Laboratory
McClellan Air Force Base, California 95652

Attention: Brigadier General T. Hammond
Vice Commander, McClellan Air Logistics Center

Gentlemen:

Subject: NRC Inspection

This refers to the special safety inspection conducted by Mr. M. Grayson of this office on August 9, 10, 15, 1983 of activities authorized by NRC License No. 04-09951-04 and to the discussion of our findings held by Mr. M. Grayson with you and other members of your staff at the conclusion of the inspection.

The inspection was an examination of the activities conducted under your license as they relate to radiation safety and to compliance with the Commission's rules and regulations and the conditions of your license. The inspection consisted of selective examinations of procedures and representative records, interviews with personnel and observations by the inspector.

Based on the results of this inspection, it appears that one of your activities was not conducted in full compliance with NRC requirements as set forth in the Notice of Violation, enclosed as Appendix A. This violation has been categorized into a severity level as described in the NRC Enforcement Policy, 10 CFR Part 2, Appendix C.

In addition it is recommended that you implement an environmental radiation monitoring program, to include but not be limited to Magpie Creek and other potential points of release to unrestricted areas. This will provide improved documentation of compliance with the unrestricted area effluent release limits in 10 CFR 20.106.

Your response to this notice is to be submitted in accordance with the provisions of 10 CFR 2.201 as stated in Appendix A, Notice of Violation.

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The response directed by this letter and the accompanying Notice are not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, PL 96-511.

If you have any questions on this matter or concerning this inspection, please telephone Mr. Grayson on 415-943-3700.

Sincerely,

L. A. Norderhaug
For: Ross A. Scarano, Director
Division of Radiological Safety
and Safeguards Programs

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Licensee

Department of the Air Force

1155th Technical Operations Squadron

McClellan Air Force Base, California 95652

Facility Name: 1155th Technical Operations Squadron

Inspection conducted: August 9, 10, 15, 1983

Inspector:

Wm. Mark Grayson
Wm. Mark Grayson, Radiation Specialist

9/29/83
Date Signed

Approved:

R. D. Thomas
R. D. Thomas, Chief, Materials Radiation
Protection Inspection and Licensing Section

9/29/83
Date Signed

Approved by:

F. A. Wenslawski
F. A. Wenslawski, Chief, Radiological Safety Branch

9/30/83
Date Signed

Summary:

Inspection of August 9, 10, 15 1983 (Report No. 83-01)

This special safety inspection was conducted due to changes in the licensee radioactive waste disposal procedures since the last inspection, and public concern related to the licensee's radioactive waste disposal practices. The inspection emphasized liquid and gaseous effluent releases and solid radioactive waste disposals. Other related aspects of the licensee's radiation protection program were also reviewed during the inspection.

Areas examined during this inspection included, organization; audits; training and qualifications; instruments; radiological surveys; leak tests; use of materials; radiation protection procedures; receipt and transfer of materials; personnel dosimetry; radioactive waste disposal/effluent controls; required postings; and independent inspection effort. This inspection involved 28.5 inspector hours onsite by one inspector.

Results: Of the thirteen areas inspected, one violation of NRC Regulations was identified (lack of survey - see Item 11 for details). Based upon the results of this inspection and associated confirmatory surveys, no licensee activities including liquid or solid radioactive waste disposal practices were found which would compromise public health and safety.

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*Lt. Col. M. Meyers, Chief, Bioenvironmental Engineering
 *Capt. K. DenBleyker, McClellan Central Lab RPO
 Lt. M. Ierardi, Bioenvironmental Engineering
 Sgt. A. Cofresi, Bioenvironmental Engineering
 *M.S. D. Verzyl, McClellan Central Lab, Public Affairs Officer
 *Sgt. R. Halverson, McClellan Central Lab, Asst. RPO

~~Mr. D. DenBleyker, Assistant Chief, Civil Engineering Lab~~

Airman S. Godio, Bioenvironmental Engineering
 Mr. B. Hancock, Foreman Industrial Waste Treatment Plant
 Mr. C. Ambrose, Operator Industrial Waste Treatment Plant
 Mr. K. Lavin, Public Affairs Officer, McClellan Air Force Base
 *Mr. J. Hanchett, NRC Region V, Public Affairs Officer

*Denotes those attending the exit interview.

2. Background

This was a special safety inspection which was conducted because of changes in the licensee's disposal procedures since the last inspection authorized during a licensee renewal, and public concern related to the licensee's radioactive waste disposal practices. The instruments used during this inspection were an Eberline PRM-7 Micro-R-Meter, Serial Number 247 due for recalibration on September 28, 1983 and an Eberline E-520 in conjunction with HP-260 and HP-270 probes, Serial Number 1943, due for recalibration on September 27, 1983. In addition, a total of 12 water samples were taken from the industrial waste system, sanitary waste system, two holding ponds and two creeks during the inspection. Three sediment samples were taken, two on Maggie Creek, and one on Second Creek. Three soil samples were taken, one in the Reclamation Area 6 where effluent from the industrial waste system is utilized for irrigation, and two in reference background areas. As an additional cross check of measurement capabilities and systems the confirmatory measurement samples were split with the licensee. The results of the NRC's confirmatory measurements are provided in Appendix B.

3. Organization

Licensed activities take place principally within Building 628, the McClellan Central Laboratory. Other use or storage areas include Buildings 646, 626, and Camp Kohler. The licensee is also authorized to utilize materials at Hickam Air Force Base, Alaska; Detachment 460, and temporary job sites anywhere in the United States. The licensee, McClellan Central Laboratory, 1155 Technical Operations Squadron, is a tenant at McClellan Air Force Base. Organizationally, the 1155th Technical Operations Squadron reports to Patrick Air Force Base, Florida.

Support functions are provided to the 1155th Technical Operations Squadron by McClellan Air Force Base as part of the host tenant relationship.

4. Internal Audits

The licensee is performing audits over and above that required by the license. The McClellan Central Laboratory Radiation Protection Officer (RPO) is performing quarterly audits of the radiation protection program. Annual quality assurance audits which are conducted also review many

aspects of the radiation protection program as part of an overall

laboratory safety review. Annual program reviews have been performed by the Bioenvironmental Engineering Health Physics staff and the Occupational Environmental Health Physics staff from Brooks Air Force Base, Texas. Licensee audit programs have assisted the licensee in meeting regulatory requirements.

No violations were identified.

5. Training and Qualifications of Personnel

Licensed materials are utilized only by individuals whose training and

qualifications are reviewed by the licensee's Radiation Safety Committee.

The training requirements for the Radiation Protection Officer (RPO), specific to this license and the McClellan Air Force Base Radiation Safety Officer (RSO), were reviewed and found to be satisfactory. Orientation lectures are given to new employees. Female workers receive special briefings on potential health risks from exposures during pregnancy.

No violations were identified.

6. Radiation Protection Procedures

The licensee supplements the basic radiation protection program (CENR-161) with supplemental Operation Instructions (OI's) which are developed by the Radiological Protection Officer. Those supplemental Operating Instructions reviewed were found to be adequate. During the walk-through of the licensee's facilities, no smoking, eating, or drinking was observed in laboratory areas where samples were being handled or processed. Laboratory coats, gloves and booties are utilized to prevent the spread of contamination. The licensee has a program for monitoring hands and feet prior to leaving contaminated areas. Radiological protection procedures were observed to be posted in Building

6201

No violations were identified.

7. Use of Materials

Review of licensee inventory records indicated that the licensee possessed only materials authorized by the license. These inventories are performed quarterly and are kept on a computer to assure compliance

628, update the master computer inventory weekly.

Review of pertinent records indicated that the licensee was complying with the use area restrictions of License Condition 10.

No problems were observed regarding the security of licensed materials.

Entry into the principle use areas in Building 628, is controlled by a guard station which is manned 24 hours a day. All doors are alarmed to further prevent unauthorized entry or exit from Building 628.

No violations were identified.

8. Instruments

The licensee calibrates the portable survey instruments quarterly. Instrument calibration records were reviewed for six Victoreen Model 491's, four Ludlum Micro-R-Meters, and two PAC-1's, and were found to be as required. Digital pocket dosimeters are calibrated yearly. The

100 proportional alpha counters which are calibrated/checked before each use as required by the licensee's procedures. The licensee also has a number of germanium detectors which support licensed activities. These gamma detectors are checked daily for constancy at energies between 122 keV to 1352 keV. Instrument calibration is checked by intercomparison with other participating Department of Energy Laboratories annually.

No violations were identified.

9. Receipt and Transfer of Material

Procurement of radioactive materials must be approved by the Radiation Protection Officer. Incoming materials are surveyed and then given a control number prior to delivery to use areas. The records of receipt reviewed were as required by the licensee's procedures.

Two principle types of transfers of radioactive material take place from the licensee's facilities at McClellan Air Force Base. The first being transfers of small amounts of radioactive materials in check sources, which are sent to temporary use locations outside the continental U.S., and the other being transfer of radioactive wastes to authorized disposal sites. The licensee's records of transfer of radioactive material, reviewed

during the inspection, were as required by 10 CFR 30.51.

No violations were identified.

10. Personnel Monitoring

The personnel monitoring records reviewed, since the last inspection, showed that the personnel exposures associated with the licensed activities were acceptable. The average exposure of the approximately 100 people associated with the licensed activities was stated to be 3.3 mr/year. For the licensee personnel monitoring records reviewed, no

the licensee has established an investigational limit of 40 mr/month. If an individual exceeds this level an internal investigation will take place to determine if future exposures can be reduced or prevented.

The licensee is not presently required to have a bioassay program for evaluating the internal deposition of radionuclides. The licensee is presently in the process of implementing such a program and is establishing baseline data.

No violations were identified.

11. Radiological Surveys

The licensee's procedures require quarterly surveys of areas where radioactive materials are utilized or stored. The licensee is performing surveys bi-monthly and as such exceeds the requirement stipulated in their present license. In addition, project leaders take contamination swipes at pertinent times during or after a project to assure contamination potential is minimized and to prevent cross contamination of projects.

The licensee at various times during the environmental level radiation work between September 1977 and May 1981 at Buildings 628 and 646, and from June 1981 to March 1982 at Camp Kohler, failed to perform surveys of potentially contaminated trash to demonstrate that it was not radioactive prior to disposal. Failure to perform surveys of potentially contaminated trash was identified as a violation.

12. Leak Tests

The licensee does not possess any sealed sources which contain large enough quantities of radioactive material to require leak testing.

No violations were identified.

13. Radioactive Waste Disposal/Effluent Controls

A. Disposal by Release to the Industrial Waste System

Prior to the September 1982 renewal of the license, the licensee collected liquid radioactive wastes, packaged the liquids with absorbents or solidified them to meet disposal site criteria, and sent them off base for disposal. Since the September 1982 renewal of the license, the licensee's procedures for handling liquid radioactive wastes have been changed. Currently, the licensee collects liquid radioactive wastes and assays for radionuclide content. Based on this assay, radioactive wastes which meet the solubility criteria and which can be diluted to meet the concentration limits of 10 CFR Part 20, Appendix B, Table II as

required by 40 CFR 20.106, are released to the industrial waste system. Licensee's records indicate that the total quantities released since the 1982 license renewal were quite small, approximately 20 uCi in 1982 and 18 uCi in 1983. The waste stream is further diluted by the total volume of the industrial waste water in the industrial waste system, prior to release to an unrestricted area. After treatment, the reclaimed industrial waste waters are pumped into a concrete lined holding pond prior to being distributed throughout the base. Licensee estimates are that approximately 68% of the total volume of reclaimed water is utilized for irrigation at 14 areas on the base, 5% is utilized for jet engine test cells, and 26% for cooling towers. Reclaimed water could potentially enter Magpie Creek through the base storm drainage system. There are two ways this could happen, first, this could take place by having runoff from areas irrigated with reclaimed water enter the storm drainage system which in turn empties into Magpie Creek. An additional pathway is by the direct discharge of reclaimed water from cooling towers to the storm drainage system which empties into Magpie Creek.

The licensee's records indicate that liquid radioactive wastes were diluted to acceptable release limits prior to release to the industrial waste system. Additionally, the licensees stated that the industrial waste system provides approximately a 10^6 dilution factor which would make potential releases to Magpie Creek a very small percentage of federal guidelines.

In order to evaluate the effluent releases, a comprehensive confirmatory measurements sampling survey was conducted. Three sediment and three soil samples were taken on base which included two background soil samples, a soil sample from Irrigation Area 6, and soil samples from the sediments of both Magpie and Second Creeks. Twelve water samples were taken at pertinent locations throughout the base. These locations included Magpie Creek at the entrance to the base, effluent from the base sanitary sewage treatment plant prior to entering Magpie Creek, reclaimed water at a cooling tower, industrial sewer system water as effluent from Building 628, Magpie Creek holding ponds, reclaimed water at a pumping station and the concrete lined holding pond, and water from both Magpie and Second Creeks. The analytical data obtained from the above soil, sediment and water samples are contained in Appendix B, Tables I, II.

B. Disposal by Release to the Sanitary Waste Sewage System

Discussions with licensee representatives indicated that no releases of radioactive liquids have taken place to the sanitary sewer system. No evidence to the contrary was identified during the inspection.

C. Solid Radioactive Waste Disposal

Solid radioactive wastes are collected in designated containers. Wastes are generally considered to be mixed fission products; although, one 55 gallon drum is kept for wastes which are of known isotopic content and concentration. Insoluble solid wastes, nondispersable liquid wastes and liquid samples which are considered too radioactive to dilute to 10 CFR Part 20, Appendix B, Table II levels are retained, solidified, and handled as solid radioactive wastes. As authorized by the license these wastes are disposed of through the base Environmental Engineering Group, in accordance with Air Force Technical Order 00-110W-2 dated November 15, 1979. Licensee records indicated that three shipments of radioactive wastes have taken place since the last inspection. These shipments took place on August 19, 1982, September 24, 1982, and October 14, 1982. All three shipments contained 30 drums and were sent to the licensed low level radioactive waste disposal site at Barnwell, South Carolina, through Air Force channels.

D. Gaseous Effluent Release

Licensee records indicated that since the last inspection on December 15, 1981 only two gaseous effluent releases took place on January 18, 1982 and on May 26, 1982. The total radioactivity released including both dates was less than 1 uCi. These materials were released through a fume hood and were diluted by the exhaust ventilation to well below the effluent release limits specified in 10 CFR Part 20, Appendix B, Table II, which demonstrates compliance with 10 CFR 20.106.

E. Direct Radiation Level Measurements

As part of the inspection effort to verify licensee compliance with effluent release limits, direct radiation level measurements were taken at various locations on the base. Radiation level measurements were taken with an Eberline E-520, NRC #8253, due for calibration on September 27, 1983, utilizing HP-260 and HP-270 probes. Measurements were also taken with an Eberline PRM-7 Micro-R-Meter, NRC#6383, due for calibration September 28, 1983. Radiation level measurements were taken at the entrance to Magpie Creek, the effluent outfall of the sanitary sewage treatment plant, Reclamation Area 6, at a cooling tower utilizing reclaimed industrial waste water, and at the exit of Magpie Creek off base. Background radiation level measurements were 3 ur/hour (gamma) as measured with the PRM-7, less than 0.1 ur/hour (beta-gammas) measured with the E-520 with the HP-270 probe, beta shield open or closed, and approximately 100 counts/minute (beta-gamma) with the E-520 used in conjunction with the HP-260 pancake probe. Beta-gamma measurements taken at the surface of the water, and on the bank at the entrance of Magpie Creek onto the base, were background. Beta-gamma

measurements of the effluent outfall from the sewage treatment plant were background. Gamma radiation levels at the cooling tower, which included a sediment trap, were background. Beta-gamma measurements taken at the surface of the water and on the banks at the exit of

Measurements taken in Reclamation Area 6 were slightly higher than background. Maximum radiation levels of 1,000 counts per minute/15 cm² were measured with the Eberline E-520 used in conjunction with the HP-260 pancake probe.

Measurements taken with the HP-260 probe are qualitative in nature and need to be evaluated along with the more quantitative data obtained from soil samples taken during the inspection. Soil samples indicate that 4.7×10^{-7} uCi/gm of principally Cs-137 were present in this area. This value can be compared to an allowable radiation level limit in 10 CFR 20.106 for release of Cs-137 to water in an unrestricted area of 2×10^{-6} uCi/ml. Although not a direct comparison, these levels in soil are approximately one hundred times smaller than levels which are allowed by NRC regulations in 10 CFR Part 20, Appendix B, to be released to water in unrestricted areas. This same soil sample showed beta radiation levels to be indistinguishable from background. It should be noted that Cs-137 emits beta radiation in addition to gamma radiation and could help account for the slightly elevated readings obtained by direct radiation level measurement with the E-520 and HP-260 probe.

Guidelines for acceptable soil contamination levels were taken from a Uranium Fuel Licensing Branch Technical position, SLCY 81-516

which was related to the current NRC position by headquarters personnel. The criteria used is taken to be 10 ur/hour at one meter from the soil surface. Since direct radiation level measurements taken with an Eberline PRM-7, designed for measuring low levels of gamma emitting radionuclides, were 3 ur/hour at the surface of the soil, this area would be considered to be within guidelines for unrestricted use.

No violations were identified.

14. Postings

During the walkthrough of the licensee's facilities, the licensee was found to be in compliance with the posting requirements of 10 CFR 19.11(a), (b), (c). The licensee utilizes form NRC-3 and the alternate posting authorized by 10 CFR 19.11(b).

No violations were identified.

15. Independent Inspection Effort

The inspector discussed the washing of contaminated aircraft associated with the monitoring of atmospheric nuclear tests and evaluated the role these releases could have with the unrestricted area radiological release limits in 10 CFR 20.106. If aircraft washings had taken place concurrently with and added to releases of liquid radioactive material from licensed activities at McClellan Central Laboratory (Building 628) then the licensee would have to evaluate both sources of radioactive material, at the point of release to an unrestricted area, to demonstrate compliance with 10 CFR 20.106. Since there have been no aircraft washing since 1980, and the licensee didn't start releasing liquid radioactive wastes to the industrial waste system until authorized by their September 1982 license renewal, releases prior to September 1982 would not be associated with licensed activities and therefore would not be under NRC jurisdiction. The projected public health implications of these releases, is expected to be minimal. The licensee stated that the only sources of liquid radioactive wastes released on base since September of 1982 have been from the McClellan Central Laboratory. Licensee data on liquid radioactive wastes, from McClellan Central Laboratory prior to release to the industrial waste system, would therefore be adequate to demonstrate compliance with liquid radioactive waste effluent release limits of 10 CFR 20.106. If aircraft washings occur in the future, the need to provide better records of associated releases as well as a need to provide radiological monitoring was discussed at the exit interview. Aircraft washings are an example of sources of radioactivity which would add to base effluents and would make it necessary to monitor at the point of release to an unrestricted area; i.e. where liquid radiological effluents leave the base, vs monitoring only at Building 628, the point of current releases.

No violations were identified.

16. Conclusions

One violation of NRC requirements was identified as a result of this inspection (see report section 11). Based on the results of this inspection, no licensee activities, including solid and liquid radioactive waste controls, were found which would compromise public health and safety. The results of NRC confirmatory measurements are provided as Appendix B.

17. Exit Interview

An exit interview was held with Brigadier General T. Hammond and other licensee representatives denoted in paragraph 1, on August 10, 1983 to discuss preliminary inspection findings. The need to perform and document surveys of potentially contaminated trash was discussed. The need to maintain improved documentation of potential effluent stream contamination that could result from future contaminated aircraft washings was discussed. The inspector also suggested that the licensee implement an environmental radiation monitoring program to include but not be limited to Magpie Creek and other potential points of release to unrestricted areas.

APPENDIX B

Nuclear Regulator Commission Confirmatory Survey Results

Twelve liquid samples and 6 soil samples were taken during this survey. These samples were split with the licensee to serve as a check on measurement technique consistency. NRC confirmatory samples were analyzed by Idaho National Engineering Laboratory following established procedures. Analysis performed on all twelve liquid and six soil samples included; gamma spectroscopy, gross beta, and gross alpha evaluations. In addition, twelve liquid and five soil samples were evaluated for H-3 and five liquid and five soil samples were evaluated for C-14. Using a 3 sigma test for statistical

significance, three samples showed low levels of activity above background. Two soil samples were found to contain low levels of Cs-137, one from Reclamation Area Six with a concentration level of 4.7 ± 0.28 E-7 uCi/gm and one from Second Creek sediment with a concentration level of $1.59 \pm .25$ E-7 uCi/gm. Background gamma radiation concentration levels for soils at McClellan were evaluated using soil sample number four as a reference and was determined to be 3.28 ± 1.9 E-8 uCi/gm. For comparison purposes Cs-137 concentration levels found in soil number one of 4.7×10^{-7} uCi/gm and soil number six of 1.59×10^{-7} uCi/gm are approximately one hundred times smaller than the limit of 2×10^{-5} uCi/ml of Cs-137 allowed by 10 CFR 20.106 to be released by licenses to water in an unrestricted area. The third sample

showing concentration levels slightly above background was liquid sample number three which was from standing water in a trench in Reclamation Area Six. This sample showed gross alpha concentration levels of 1.0 ± 0.1 E-8 uCi/ml as compared to a background alpha concentration level 1.3 ± 0.3 E-9 (from sample number one). The radiological significance of this level of activity can be evaluated by comparison against the most restrictive release limit in 10 CFR 20.106 for release of alpha emitting radionuclides to water in an unrestricted area, of 3×10^{-8} uCi/ml for Ra-226. The sample alpha concentration level of 1×10^{-8} uCi/ml is also below the most restrictive EPA drinking water limit of 5×10^{-6} uCi/ml for Ra-226. As such all concentration levels found in the NRC confirmatory measurements could be released to water to an unrestricted area, and at these levels should not

adversely affect public health and safety. The results presented included a plus or minus value which is a total statistical uncertainty resulting from all random processes involved at the 68% confidence level, or one standard deviation. The independent confirmatory measurement results are as received from Idaho National Engineering Laboratory and are as follows:

APPENDIX B

Confirmatory Measurements

TABLE 1

LIQUID SAMPLES - Units uCi/ml

| <u>SAMPLE NUMBER AND LOCATION</u> | <u>Gamma Spectroscopy Results</u> | <u>Gross Beta Results</u> | <u>Gross Alpha Results</u> | <u>H³</u> | <u>C¹⁴</u> |
|--|---|-----------------------------------|------------------------------------|-----------------------|-----------------------|
| <u>Liquid No. 1</u> Entrance to Maggie Creek (Background) | Cs-137 $-8 \pm 1 \text{ E-8}$ | $5 \pm 5 \text{ E-9}$ | $1.3 \pm 0.3 \text{ E-9}$ | $2 \pm 2 \text{ E-7}$ | - |
| <u>Liquid No. 2</u> Effluent from sanitary sewage treatment plant- to Maggie Creek | Cs-137 $1.2 \pm 0.7 \text{ E-8}$ | $1.3 \pm 0.6 \text{ E-8}$ | $8 \pm 2 \text{ E-10}$ | $2 \pm 2 \text{ E-7}$ | - |
| <u>Liquid No. 3</u> Standing Water Reclamation Area 6 | Cs-137 $1.4 \pm 0.7 \text{ E-8}$ | $2.3 \pm 1.2 \text{ E-8}$ | $1.0 \pm 0.1 \text{ E-8}$ | $0 \pm 2 \text{ E-7}$ | - |
| <u>Liquid No. 4</u> Cooling Tower 677 North | Cs-137 $2.0 \pm 6.0 \text{ E-9}$ | $5 \pm 7 \text{ E-9}$ | $3.1 \pm 0.6 \text{ E-9}$ | $0 \pm 2 \text{ E-7}$ | - |
| <u>Liquid No. 5</u> Effluent Industrial Sewage Treatment Plant | Cs-137 $-8 \pm 1 \text{ E-8}$ | $5 \pm 7 \text{ E-9}$ | $1.4 \pm 0.5 \text{ E-9}$ | $0 \pm 2 \text{ E-7}$ | - |
| <u>Liquid No. 6</u> North Effluent | Cs-137 $-7 \pm 1 \text{ E-8}$ | $1.3 \pm 0.6 \text{ E-8}$ | $1.2 \pm 0.3 \text{ E-9}$ | $0 \pm 2 \text{ E-7}$ | - |
| <u>Liquid No. 7</u> Bldg 628 Industrial System Effluent | Cs-137 $2.0 \pm 7.0 \text{ E-9}$ | $-2 \pm 5 \text{ E-9}$ | $2.5 \pm 0.4 \text{ E-9}$ | $2 \pm 2 \text{ E-7}$ | - |
| <u>Liquid No. 8</u> Standing Pond Site 12, South End | Cs-137 $-6.4 \pm 1.1 \text{ E-8}$ | $3 \pm 5 \text{ E-9}$ | $6 \pm 2 \text{ E-10}$ | $2 \pm 2 \text{ E-7}$ | $0 \pm 1 \text{ E-7}$ |

| <u>SAMPLE NUMBER AND LOCATION</u> | <u>Gamma Spectroscopy Results</u> | <u>Gross Beta Results</u> | <u>Gross Alpha Results</u> | <u>H³</u> | <u>C¹⁴</u> |
|--|---|-----------------------------------|------------------------------------|----------------------|-----------------------|
| <u>Liquid No. 9</u> Standing Pond Site 13, North End | 8.65±6.3 E-9 | 6±5 E-9 | 1.2±0.2 E-9 | 0±2E-7 | 0±1 E-7 |
| <u>Liquid No. 10</u> Reclaimed System Lined Holding Pond | 1.26±.70 E-8 | 6±6 E-9 | 7±4 E-12 | 2±2 E-7 | 0±1 E-7 |
| <u>Liquid No. 11</u> Reclaimed System Overflow Pond | 1.87±.64 E-8 | 2±7 E-7 | 1.8±0.4 E-9 | 2±2 E-7 | 0±1 E-7 |
| <u>Liquid No. 12</u> 2nd Creek Effluent At Bare Boundary | 2.73±6.9 E-9 | 10±6 E-9 | 1.5±0.3 E-9 | 2±2 E-7 | 0±1 E-7 |

TABLE II

SOIL SAMPLES - Units uCi/gm

| <u>Soil No.</u> | <u>Gamma Spectroscopy Results</u> | <u>Gross Beta Results</u> | <u>Gross Alpha Results</u> | <u>H³</u> | <u>C¹⁴</u> |
|---|---|-----------------------------------|------------------------------------|----------------------|-----------------------|
| <u>Soil No. 1</u> Reclamation Area 6 | Cs-137 4.7±0.28 E-7 | 2.9±0.2 E-5 | 1.9±.4 E-5 | - | - |
| <u>Soil No. 2</u> Licensee- Background Soil Building 334 | Cs-137 -3.9±3.2 E-8 | 2.9±0.2 E-5 | 3.1±0.6 E-5 | 2±2 E-7 | 0±1 E-7 |
| <u>Soil No. 3</u> Licensee Magpie Creek Sediment | Cs-137 4.04±1.9 E-8 | 2.8±0.2 E-5 | 1.2±0.3 E-5 | 0±2 E-7 | 0.5±1 E-7 |
| <u>Soil No. 4</u> Influx Magpie Creek (Background) | Cs-137 3.28±1.9 E-8 | 3.0±0.2 E-5 | 1.6±0.4 E-6 | 0±2 E-7 | 0±1 E-7 |
| <u>Soil No. 5</u> Magpie Creek Effluent Sediment | Cs-137 6.67±1.9 E-8 | 3.5±0.3 E-5 | 9±2 E-6 | 2±2 E-7 | 0±1 E-7 |
| <u>Soil No. 6</u> 2nd Creek | Cs-137 1.59±.25 E-7 | 2.5±0.2 E-5 | 1.4±0.3 E-5 | 0±2 E-7 | 0±1 E-7 |