

**THE MISSOURI PROGRAM FOR THE
INSPECTION AND EVALUATION OF
EXISTING ONSITE WASTEWATER
SYSTEMS
AT TIME OF LOAN TRANSACTIONS**

RANDALL J. MILES, UNIVERSITY OF MISSOURI

DENNIS M. SIEVERS, MARSHALL ENGINEERING

**JAMES GAUGHAN, MISSOURI DEPARTMENT OF HEALTH
AND SENIOR SERVICES**

**PERCY JOHNSON, MISSOURI DEPARTMENT OF HEALTH AND
SENIOR SERVICES**

**USDA-CREES NATIONAL WATER CONFERENCE
JANUARY 31, 2007**

SAVANNAH, GA

Assessment of an on-site wastewater system for loan transactions in Missouri are covered under two programs:

- **Loan inspection**
- **Loan evaluation**

What is the difference between a loan inspection and a loan evaluation of an on-site wastewater system?

A loan inspection is more thorough and comprehensive assessment than an evaluation in that an inspection involves “popping lids”, taking measurements and dimensions, performing a stress test, and perhaps injecting a tracer into the system.

A loan evaluation assessment is essentially a “walk over” or a “scratch and sniff”. Basically one just looks or smells for failure. Few measurements are made.

The only commonality for both assessments is that a water sample is taken for microbiological assessment if the residential water source is a private well

Currently all individuals going through certification are certified to perform both loan inspections and loan evaluations.

Although some certified individuals may not chose to do both assessments.

THE COURSE HAS BEEN OFFERED IN TWO VERSIONS:

- **AS A TWO-DAY COURSE WITH SUCCESSFUL COMPLETION OF THE CERTIFIED INSTALLS COURSE AS THE PRE-REQUISITE**
- **AS A THREE-DAY COURSE WITH THE FIRST DAY AS A REMEDIAL COURSE TO PROVIDE A BACKGROUND FOR ONSITE SYSTEMS WITH THE LAST TWO DAYS SIMILAR TO THE MAINLINE TWO-DAY COURSE ABOVE**

TOPICAL COMPONENTS OF THE TWO-DAY COURSE

- HEALTH AND SAFETY
- EQUIPMENT NEEDED TO PERFORM INSPECTIONS AND EVALUATIONS
- MATH BASICS
- PRINCIPLES OF WATER TRACING
- WATER WELL INSPECTION AND WATER TESTING
- INSPECTION OF ON-SITE WASTEWATER SYSTEMS
- EVALUATION OF ON-SITE WASTEWATER SYSTEMS

HEALTH AND SAFETY TOPICS

- HAZARDS OF WORKING AROUND WASTEWATER
- CONFINED SPACE CONSIDERATIONS
- VIRUSES AND PATHOGENS
- ELECTRICAL SAFETY CONSIDERATIONS

EQUIPMENT TO PERFORM INSPECTIONS

- FORMS AND PERSONAL PROFESSIONAL ITEMS
- SYSTEM STRESS TOOLS
- EXCAVATION EQUIPMENT
- HEALTH RELATED EQUIPMENT
- MISCELLANEOUS TOOLS

MATH BASICS

- AREA OF A SURFACE
- VOLUMES-RECTANGULAR AND CYLINDRICAL TANKS
- VOLUME OF WATER WHEN A TANK IS NOT FULL
- PUMP DELIVERY RATE
- TIME DOSING CALCULATIONS
- DEFINITIONS AND CONVERSION FACTORS

WATER TRACING BASICS

- WHAT IS WATER TRACING?
- TYPES OF TRACERS
- NEGATIVE TRACERS
- WHY TRACERS FAIL
- COMMON PROBLEMS
- CHARACTERISTICS OF A POSITIVE TRACER
- REGISTRATION

WATER WELL INSPECTION AND WATER TESTING

- TYPES OF WATER WELLS
- WATER RESOURCES IN MISSOURI
- QUALITIES OF WATER RESOURCES IN MISSOURI
- WATER WELL INSPECTION POINTS
- PRINCIPLES OF WATER TESTING

Loan Inspections

- The certified individual is registered through the Missouri Department of Natural Resources-Department of Geological and Land Survey (DGLS) to perform water tracing methods.
- Individual also performs water well assessment relative to guidelines of DGLS.

General forms for Loan Inspection

- Authorization form
- Water well sampling form
- Owner interview form
- Site sketch map
- Stress/dye test form and procedures for conventional and alternative systems

Categories of inspection points & forms:

- Existing privy
- Existing holding tank
- Set back distances chart
- How to locate septic tanks
- Existing septic tanks
- Types of gravity absorption fields-
conventional
 - Graveless
 - Chamber
 - Distribution box
 - At-grade field
- Existing lagoon

**EXISTING SEPTIC TANK
ON-SITE SITE SEWAGE DISPOSAL INSPECTION**

Use the Site Sketch page to provide a diagram of the site. The diagram need not be to scale.

Property owner _____ Telephone () _____
 Requesting party _____ Telephone () _____
 Job Order # _____ Inspector ID _____
 Site Address _____ City _____
 Zip Code _____ Date _____

Septic tank & Plumbing:

Yes No Repairs
 Completed

- | | | | |
|--------------------------|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. All waste drain lines from the home are plumbed to the sewage tank |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Access ports to tank are locked or otherwise inaccessible to children |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Tank appears in sound condition without cracks or apparent leakage
(Metal tanks have bituminous coating intact - No rusting) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Lids & risers are in sound condition without cracks or apparent
leakage. (Metal risers have bituminous coating intact - No rusting) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. There is a clean out between the house and the sewage tank |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Sewage tank is equipped with inspection risers to surface over
baffles or T's |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Baffles or T's are in sound condition, not broken or decomposed |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Baffles and T's do not allow scum or sludge to exit the tank |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 9. Sludge depth is appropriate for tank size |
| | | | 10. Actual sludge depth is _____ inches |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 11. Scum thickness is appropriate for tank size |
| | | | 12. Actual scum thickness is _____ inches |

Items marked "No" in sections 1-12 reflect neglect, improper construction or problems that impede the proper operation of the primary treatment device. Marking either 9 or 11 "No" indicates the tank needs to be pumped. Repair of these items does not require a permit in most counties.

Septic tank Sizing:

Table 1 determines proper tank size before 1990 Table 2 determines proper tank size 1990-Present

1-2 bedroom house-----750 gallon	1-3 bedroom house-----1000 gallon
3 bedroom house-----900 gallon	4 bedroom house-----1250 gallon
4 bedroom house-----1000 gallon	5 bedroom house-----1500 gallon
each addition bedroom-----250 gallon	Multifamily tanks-----V=1.5Q+500 gallon

- | | | | |
|--------------------------|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 13. Sewage tank is properly sized for the home it serves |
| | | | 14. Actual Size is _____ gallons |

Summary Report: Existing Septic tank & Plumbing

Yes

No

A. All mandatory interview and inspection forms are attached & complete *

B. All sewage system deficiencies noted on the inspection have been corrected

Yes

No

N/A

[If the home is served by a Public Water supply, mark C & D as N/A]

C. All well construction deficiencies noted on the inspection have been corrected

D. A satisfactory bacteriological sample is attached.

If statements A & B are answered "Yes", the sewage system, in the opinion of the Licensed Private Inspector, on the date of the inspection, met the requirements of the inspection and was not in violation of RSMo 701.025-.059.

If statements C & D are answered "Yes", the water supply on the date of the inspection had the proper outward construction and was bacteriologically safe.

If statements C & D are answered N/A the water supply is a public water supply regulated by the Department Natural Resources

Comments:

(Please Print)

Inspectors Name: _____

Signature of Inspector _____

Notice,

The property owner is not obligated to contract for repair or reinspection of this onsite sewage disposal system with the initial licensed Inspector

* The following forms should be present with this inspection:

1. Interview questionnaire with authorization for inspection
2. Set back inspection
3. Existing Septic Inspection
4. Stress Test / Dye Test
5. Water well inspection (forms 5 & 6 are not necessary on a public water supply)
6. A satisfactory bacteriological water sample is attached

Inspection Points and Forms

(cont)

- Existing non- NSF standard 40 aerated sewage tank
- Existing NSF standard 40 sewage tank
 - Multi-Flo
 - Jet, Inc.
 - Norweco
 - Etc.
- Existing mound
- Existing low pressure pipe
- Existing pump tank (control panels and floats and switches)
- Existing sand filter
- Existing biofilter
 - Waterloo
 - Advantex
 - Aerocell
 - Peat filters
 - Etc.
- Existing wetland
- Existing drip irrigation





Loan Evaluation Guidelines & Forms

- Federal mortgage lending guidelines
- Copies of sections of the Missouri on-site code
- Soil survey of the county (if one is available)
- Existing treatment system loan evaluation form
- Existing loan evaluation form

**ONSITE SEWAGE SYSTEM LOAN EVALUATION
EXISTING TREATMENT SYSTEMS**

The evaluation is for lending evaluation purposes only and does not constitute a rigorous onsite inspection. It does not guarantee the continued functioning of this system.

Property owner _____ Telephone () _____
Requesting party _____ Telephone () _____
Site Address _____ City _____
Zip Code _____ Date of evaluation _____
Inspector/Evaluator ID _____

SYSTEM (Check all that applies to this site)

Septic Tank _____ Aeration Tank _____ Pump Tank _____ Conventional Trench Field _____

Low Pressure Pipe Field _____ Other (specify) _____

Tank(s)

Yes No

- 1. Tanks can be located?
- 2. Are there noticeable odors near the tank(s)?
- 3. Is there surfacing of sewage around the tank(s)?
- 4. The distance from the tank(s) to the nearest well is _____ feet.
- 5. There is a clean out between the house and the sewage tank
- 6. If a tank has an aerator, is the aerator motor running?

COMMENTS:

ABSORPTION FIELD

Yes No

- 1. Absorption field can be located?
- 2. Are there noticeable odors coming from the field?
- 3. Is there surfacing of sewage or water pooled in or near the field?
- 4. Are there any pipes coming to the soil surface in or near the field?
- 5. Are there areas of excessive vegetation growth due to nutrients and/or water in or near the field?

COMMENTS: _____

OTHER
YES NO

1. Are there obvious signs of past sewage surfacing or discharges (e.g. black areas on soil or vegetation, odors, lack of vegetation, etc.?)
2. Are there obvious signs of sewage flowing onto this site from adjacent property?
3. There is a modern published, detailed soil survey for this site?
4. According to the modern published, detailed soil survey, this site has suitable permeability for a soil absorption system.
5. According to the modern published, detailed soil survey, this site does not exhibit a water table in the upper five (5) feet of the soil profile.

COMMENTS: _____

On the date of this evaluation, the on-site sewage treatment and disposal system appears to be:

- Satisfactory
- Unsatisfactory
- Unable to determine

Inspector/Evaluator Name (Please print) _____

Inspector/Evaluator Signature _____

Date _____

For Loan Evaluation

- No “lids are popped”
- Sight and smell are used to assess the surfacing of sewage
- Soil survey is used to assess soil suitability of a system relative for a system. Also assessed is presence of water table.

The summarization component of the loan evaluation form allows the professional assessor to check one of the following:

On the date of this evaluation, the onsite sewage treatment and disposal system appears to be:

- Satisfactory
- Unsatisfactory
- Unable to determine

For the both the loan inspection and loan evaluation programs, the certified professional does **NOT** pass or fail the system, but just reports the appearance or conditions of the system.

The home buyer, the home seller and the associated lending institutions are the ones who must decide how well they can live with or deal with the system in its current state.

Future Considerations

- Educational program for users relative to the difference between the two assessments
- Greater inclusion of inspectors and evaluators in the state wastewater organization (already initiated)
- Greater outreach to home inspectors
- More comprehensive assessment of students in the course and associated training CEU's.
- Developing continuing education courses for inspector and evaluators

Future Considerations

- **Reformatting and updating current inspection forms**
- **Addition of new forms for new technology and new products**
- **Will be using the CIDWT O&M operational check lists to update specific inspection form points**
- **Contact industry personnel to assist in update of inspection forms**

In Summary

- Loan inspections are more comprehensive and intrusive and look at the component parts.
- Loan evaluations are based primarily on the appearance “on this date.”

